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JOURNAL
OF THE
ASIATIC SOCIETY OF BENGAL.



VOL. LXIV.

PART I. (HISTORY, ANTIQUITIES, &C.)

Nos. I to IV.—1895 : WITH 29 PLATES.

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HONORARY PHILOLOGICAL SECRETARY.

“It will flourish, if naturalists, chemists, antiquaries, philologers, and men of science in different parts of *Asia*, will commit their observations to writing, and send them to the Asiatic Society at Calcutta. It will languish, if such communications shall be long intermitted ; and it will die away, if they shall entirely cease.”

SIR WM. JONES.

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ERRATA.

- P. 238, ll. 6 and 7 from bottom, for *Çr Çr*, read *Çrī Çrī*.
 239, „ 9 and 10 „ *Çr Çr*, „ *Çrī Çrī*.
 244 and 245, for every *Çr* read *Çrī*.
 309, l. 22, from top, for *harēndē*, read *karēndē*.
 „ l. 3, from bottom, for *sunḍi* „ *sunī*.
 313, l. 10, „ *āyosē* „ *āyōsē*.
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 „ l. 8, „ *āyō hē* „ *āyōhē*.
 323, l. 5, from top for *hāuj* „ *hā*.
 327, l. 13, „ *hō* „ *hun*.
 329, l. 23, „ *asādē* „ *assādē*.
 „ „ „ *salā* „ *salām*.
 363, l. 17, from bottom for *māry-va* „ *māryu-va*.

JOURNAL

OF THE

ASIATIC SOCIETY OF BENGAL.



Part I.—HISTORY, LITERATURE, &c.

No. I.—1895.

*On changes in the course of the Kusī River, and the probable dangers arising from them.*¹—By F. A. SHILLINGFORD.

With a Map.

[Read, February, 1895.]

For several years past the Kusī, or Kōsī, river has been attracting much attention owing to the sudden shift of its main channel on the borders of Nepal whereby a considerable volume of its flood waters has been thrown eastwards, over tracts of country in the District of Purneah and Dinajpur, not previously subjected to its floods, in recent years, and it seems not improbable that some unusual change in the course of this erratic river is likely to occur in the immediate future. The writer having lived nearly all his life in Purneah, visiting the banks of the Kusī, from the Nepal mountains to its junction with the Ganges, constantly, for work, or in search of sport, has had exceptional opportunities of watching the lesser as well as the more general changes of that river occurring within the last 25 years. During the rainy season of 1893, when severe floods were occurring up in the north of the District,

¹ [With reference to this paper, readers are referred to the discussion recorded in the Proceedings of the Society for February 1895, in which the propriety of certain of the author's conclusions as regards the physical aspect of the case are seriously impugned. Ed.]

the author deemed it his duty to place the crude notes he had made, during a series of years, regarding the movements of the Kusī, and upon which this paper is chiefly founded, before Government, so as to help as a guide in case of danger, and if his efforts are now successful in drawing attention to this important and interesting subject, his labors will be amply rewarded. The theories that this paper is intended to elucidate are:—

(1) That the main channel of the Kusī river oscillates (in its general sense) over a vast tract of country, from the Brahmaputra to the Gaṇḍak rivers, having practically Catrā Gaddī (Chatra Gaddi of the maps), in Nepal, as its centre, or pivot of oscillation, and that these oscillations are repeated at long intervals of time.

(2) That the westward movement of each oscillation is slow, and in a series of steps, each of which is attended with damage to property, but of a temporary nature.

(3) That the eastward movement of any given oscillation will probably be accomplished in one great swing, and will be accompanied with loss of life and property, with remoter dangers of a serious nature.

(4) That the detritus, resulting from the sub-aerial denudation of the Himālayas, brought down by the rivers, and thrown upon the Indo-Gangetic Plain can be held accountable for these movements of the Kusī and other rivers similarly situated.

The Kusī, or Kōsī, called in old Sanskrit works Kauçikā, is probably the river Cos Soanas (Sankōs, in Nepal) mentioned by Arrian in his *De Indicis* (*Chap. IV.*) on the authority of Megasthenes, as being one of the navigable tributaries of the Ganges.

The Kusī debouches, or rather leaps, into the Indo-Gangetic Plain in about Lat. 87 ° E. Long. 27 ° N. at Barāh Chatra, below which the magnificent falls occur, where, as is usual with all large rivers held sacred in India, there are numerous Hindū shrines, one of the most celebrated being that devoted to Mahāmāyā, situated just above the falls, which occur between Catrā Gaddī, to which boats can go up, and Barāh Chatra, about 5 miles higher up, the latter named after the Varāha, or Boar *Avatār* of Viṣṇu, to whose shrine here pilgrimages are made. For some miles below Catrā Gaddī, undulating country, interspersed with alluvial tracts, is to be met with, until the Belkar Range of hills (marked incorrectly the Sooroongah Hills in Survey Maps of 1840-47) is passed, about 20 miles below the falls, and then the wide alluvial plains may be said to begin.

Above Barāh Chatra the main stream of the Kusī is called the

San Kusī, or Sankōs, *i.e.*, united Kusī, which runs nearly East and West, and into this the other six rivers constituting the *Sapta Kauçikā* of Sanskrit works, flow in as tributaries from the North. These are, beginning from the East (1) the Tambar, or Tamrā; (2) the Aran, or Eran; (3) the Dūdh Kusī; (4) the Likhu Kōsī; (5) the Tambā Kusī; (6) the Bhotiā Kōsī. According to the most recent maps, the Tambar, called in its higher reaches the Kambachen, drains the western slopes of the snow-covered portion of the Kanchinjinga (28,176 ft.) spur, containing the high peaks of Janu, 25,304 ft., and Kabru 24,015 ft., and has its source in the snowy peaks of Chutangla, in the main ridge of the Himālayas, whose southern drainage it also receives from the Kanglachin, and the neighbourhood of the Tipta-la Passes. The Aran drains the eastern and northern slopes of Everest, 29,002 ft., and its attendant snowy peaks, and piercing the main chain of the mountains takes its rise in the further snows of Tibet; both these tributaries meet the San Kusī just above Barāh Chatra. The Dūdh, Likhu, and Tambā Kusīs carry down the drainage of the southern face of the Everest and Chumlang (24,020 ft.) blocks of snows, whilst the Bhotiā Kusī penetrates the main range, and rises in Tibet, draining the eastern slopes of the Gosainthan, 26,305 ft., and Dyabang, 23,762 ft. The San Kusī itself has its source on the southern face of Dyabang, beyond Katmāṇḍu. Standing near any one of the rest-houses on the great Singalila range, the most elevated spur thrown out southward from the main range, in this portion of the Himālayas, the crest of which forms a portion of the western boundary of British Sikhim, and looking westwards and northwards, one cannot help being struck with the vast extent of the work of denudation performed by the Sapta Kusī, in carving out the huge valleys and rugged gorges which stretch in a series of stupendous waves as far as the eye can reach, over a region of mountainous country, extending from Kanchinjinga to beyond Katmāṇḍu, and from the alluvial plains of Bengal to the further chain of the Himālayas, forming the southern watershed of the Brahmaputra,—a tract of country 200 miles long by 150 miles wide, containing the two highest mountain peaks in the world, with their attendant masses of perpetual snow. Thus the Kusī drains a larger tract of the Himālayas and delivers a greater volume of water as it debouches into the plains than any other stream on the southern slopes of the Himālayas, between the Brahmaputra and the Panjāb rivers.

The Singalila spur, as continued from the main range through Kanchinjinga, Kabru, Singalila, Phalut, Tonglu, Goom, Senchal, Mahalderam, and ending at Sivok, on the Tistā, forms in Bengal,

Watershed between the Ganges and Brahmaputra, in Bengal.

at the present time the watershed between the Ganges and the Brahmaputra, and Mr. Mallet in his Memoir, "On the Geology of the Darjeeling District,"¹ remarks, "the Mahanuddy and the Teesta flow into the plains in the debateable ground where, under sub-deltaic conditions, a constant struggle is going on between the Ganges and the Brahmaputra as they approach each other from the West and from the East, across the great plain to the south of the mountains, early in the century the Teesta was a tributary of the Ganges."²

Before proceeding further it is necessary to preface future remarks by rather long extracts from the writings of previous observers, so far as they can be ascertained, on the changes in the course of the Kusī.

Dr. Buchanan Hamilton, who visited Purneah (1807-11) says,³ "I

Dr. B. Hamilton's have already mentioned a tradition which states **views.** that the Kusī, on reaching the plains instead of running almost directly south to join the Ganges, as it does at present, formerly proceeded from Catrā to the eastward, and joined the Ganges far below, and many old channels are still shewn by the populace as having been formerly occupied by its immense stream, and are still called *Būr̥hī*, the old, or *Marā*, the dead *Kōsī*. The change seems to have been very gradual and to be in a measure still going on." Further on he says, that "the Pandits inhabiting its banks allege that in times of remote antiquity the Kusī passed southward by where Tājpur is now situated, and from thence towards the east until it joined the Brahmaputra, having no communication with the Ganges;" and lower down he states, "the opinion seems highly probable, I think it not unlikely, that the great lakes North and East from Māldah are remains of the Kusī united to the Mahananda, and that on the junction of the former river with the Ganges the united mass of water opened up the passage now called the Padma, and the old channel of the Bhāgirathī from Songti to Nadiyā was then left comparatively dry."

Mr. James Fergusson, F. R. S.⁴ says, "The first river to feel the

Mr. Fergusson's effect of the tilting backward of the plane of **views.** the Ganges by the elevation of the land at Rajmehal was the Coosy, as the nearest to the delta, the consequence is that when Rennell surveyed Purneah, he saw and recorded in his

¹ Memoir Geo. Survey India, Vol. XI, Part 1. 1874.

² This is a mistake, the Tistā deserted the Ganges and joined the Brahmaputra, as is well known, in August 1787.

³ Eastern India (from MSS. of Dr. Buchanan Hamilton): by R. Montgomery Martin, Vol. III, page 15.

⁴ On recent changes in the Delta of the Ganges. Quar. Jour. Geo. Soc., London, Vol. XIX, 1863.

Memoir in the Philosophical Transactions (Vol. LXXI, p. 87) as well as in his letters that, the Coosy had at no distant date flowed past the station of Purneah and joined the Ganges 45 miles further down than its present junction." Then he quotes the extract from Buchanan Hamilton given above, about its being highly probable that the Kusī went away eastward to join the Brahmaputra, and adds, "Indeed an attentive study of the successive changes that have taken place renders this almost certain, and it is probable that the Oorasagar is the mouth by which the combined waters of the Coosy, the Mahanuddee and the Atree were originally discharged into the Assam river," i.e., the present Brahmaputra.

Dr. W. W. Hunter in his statistical account of Bengal¹ writes:

Dr. W. Hunter's views. "The Kusī is remarkable for the rapidity of its stream, the dangerous and uncertain nature

of its bed, and chiefly for its constant westerly movement;" and further on he explains this westerly movement by saying, "Within historical times, that is, from the beginning of the eighteenth century, we have evidence that this river (the Kusī) passed below the town of Purneah and then due south to the Ganges. It has since then worked across 25 miles of country till at present it forms the western boundary of the District * * * where the original bed of the Kōsī was, it is impossible to state." Then referring to Dr. Buchanan Hamilton's theory of the eastward channel of the Kusī quoted above, he says, "Dr. Buchanan's suggestion of the union with the Brahmaputra seems less improbable than other parts of his theory. The course of the Brahmaputra appears in early days to have run far to the East of

Karatoya, a large river in early Hindu times. the District of Maimansingh. The Kusī also in its eastward course would first meet the Karatōyā, then a vast river having the

Atrai and Tistā for its affluents. In my account of the district of Bogra, I have mentioned the very great importance of this river during early Hindū times, both on account of its great volume and its sanctity, and I have stated that it marks an ethnical frontier clearly defined to the present day. If we assume that the Kusī and the Mahananda formerly joined the Karatōyā, we have at once an explanation of the great size the latter river once undoubtedly had, and we shall also be able to account for the process by which the great sandy plain was built up between the Barendra of Rajshahi and the Madhupur jungle of Maimansingh, through which the Brahmaputra made its way at the beginning of this century. The ethnical frontier

¹ Statistical account of Bengal, Purneah, 1877.

which begins to be uncertain in Dinajpur District will be completed

Marks an ethnical frontier. by adopting the above course for the Kusī. On the left bank we shall have the Koch

peoples still found in such numbers in the Kissengunge Subdivision of Purneah District and in the North of Dinajpur, on the same side of the river would be the kingdoms of Kirāt, Kichak, and Kām rūp. The presence of a great river in the South of Dinajpur would also

Probably formed a barrier to Muham-madan conquest. account for the success with which the Ruler or Hākīm, as he was called, of that country resisted the arms of the Musalmān sovereigns

of Gaur. The ancient name of the Kusī and the one by which it is still known in Sanscrit books is Kauçikā. It is interesting to

Probable direction of the Kusī, about A. D. 1600. observe that a river nymph of this name is known if not worshipped on the banks of the Karatōyā. The bed of the river about

three or four centuries ago seems to be marked by the line which divides the parganas which down to the present day, preserve their agricultural records under the Bengali or Faṣlī or Bihārī eras. It is well known that these systems of computation of time are founded on the Musalmān Calendar, and like it date from the Hijra or flight of Muḥammad from Mecca. These systems came generally in use into the present District of Purneah about A. D. 1600. If the supposition be correct that the Kusī formed the boundary between the tracts in which they were in use then, the course of that river passed East of the town of Purneah and through the Police division of Manihārī, before it fell into the Ganges."

In addition to the above supposed (though highly probable) courses

Various beds of the Kusī.

of the Kusī indicated by Drs. Buchanan Hamilton and W. W. Hunter, we have the following authentic channels of former Kusīs known in history or in modern times, viz., beginning from the easternmost.

(1.) The KĀLĪ or KĀRĪ KUSĪ known in its upper reaches as the Kamlā

The Kālī Kusī.

and in Nepal as the Kajlī or Kajrī flowing about a mile to the west of the Civil Station of Purneah. The name *Kālī* (black or dark) as applied to this river is from the curious fact that this is the only one of the abandoned channels of the Kusī which carried dark limpid waters until 1889, when an inrush of muddy water came into it and gave rise to enquiries being made as to its cause, which has led up to the recent orders of Government to have the country surveyed. The clearness of its waters is conspicuous also in Nepal causing moss-like water weeds (*Kajlī*) to grow

in the rocks and boulders in its stream, hence its name Kajlī or Kajrī in the North, the natives, as noticed by Dr. B. Hamilton, being unable to distinguish between the sound of the letters *l* and *r*. This was the main Kusī in 1731, forming at that time the western boundary of the district and in that year, according to Hunter, Nawāb Saif Khān, of Purneah, crossed the Kusī and by gaining the battle of Bīrnagar over Bīr Shāh of that place, acquired the parganas of Dharampur, Gorāri, Nathpur and Dhapahar and added them to Purneah, and it is along the eastern boundaries of these very parganas that this river at present flows. This Kusī probably joined the Ganges near Manihārī at that time, to the East of Bhawānīpur, the last village in the south-east corner of Dharampur, though an older bed still existing joined the Kalindrī at Hayatpur in Māldah.

(2.) The DHĀMDĀHĀ KUSĪ known higher up as the Pheriānī and
The Dhāmdāhā Kusī, 1807-11. a branch of it as the Binaniā, this is described and shown in his map as the main Kusī by Dr. B. Hamilton in 1807-11. It flowed between Dēbīgañj station on the A. B. S. R. and Nāthpur, and to the East of Dhāmdāhā Thānā and joined the Ganges near Kārāgōlā. Between the Kālī and Dhāmdāhā Kusīs there is another well defined channel called in its upper reaches the Livarī, and lower down the Barāñḍī, which must have been occupied by the main Kusī waters between the years 1731 and 1807, but no records can be found of the exact years.

(3.) The HIRAN main Kusī of the Revenue Survey Maps of 1840-47
The Hiran Kusī, 1840-47. flowed to the West of Dhāmdāhā Thānā, and about the year 1870 began to throw off branches into the Daus swamps which became the main Kusī in 1873, and flowed into the Ganges opposite Patharghaṭṭā.

(4.) The DAUS the main Kusī from 1873 to 1893. In the Survey
The Daus Kusī, 1873-93. Maps of 1840-47 the Daus swamps in places show an outline similar to the abandoned bed of the Dhāmdāhā Kusī shown to the eastward, and marked the "old bed of the Kusī." This Kusī flowed into the Ghagrī river.

(5.) The LORAN, into which the Kusī began to throw in offshoots
The Loran Kusī since 1893. in 1891, has become the main Kusī since 1893 (inclusive), and still carries the bulk of its waters.

It is important to bear in mind that the name "Kusī" is applied generally to any river that may carry the bulk of its waters for the time being; but locally, the original river, which it has adopted as its course, still retains its name, such as Hiran, Daus, Lōran, &c.

Other Rivers in North Bhagalpur, which show signs of having been

large rivers formerly, and which have their sources (except Talābā)

Other Rivers in N. in the neighbourhood of the detrital talus,
Bhagalpur, probably at the debouchure of the Kusī into the plains,
former beds of the and whose courses, in their upper reaches
Kusī. have a westerly direction away from the banks of the Kusī, are, beginning from the East :—

(1.) The Parmān, or Parwān.

(2.) The Talābā.

(3.) The Dimrā.

(4.) The Tiljugā.

All of these rivers have probably been, at one time or another, the bed of the main Kusī, but whether they will be occupied again it is difficult to form an opinion. The detritus brought down by other rivers tends to raise the country by degrees, and each successive oscillation of the Kusī, if not controlled by artificial means, would probably have a limit farther to the Eastward.

Thus, we have the main waters of the Kusī, moving from the Kālī Kusī into the Dhāmdāhā Kusī, between the years 1731 to 1807, and then into the Hiran—an adjoining stream—between 1811 and 1840, and further, we have the Kusī waters occupying the Hiran for over 33 years, and the Daus for exactly 20 years. As the Kusī, in its march westward, is traversing a higher lay of country in each successive shift, it appears probable that the duration of the occupation of each new channel to the west, will go on diminishing, and that, from analogy, we may infer that when the Easternmost Channel is re-opened, or re-occupied, it will hold the Kusī waters for some considerable length of time.

With regard to historical allusions to a probable Eastern Channel

Probable Historical of the Kusī we have the Chinese pilgrim,
cal allusions to the Hiuen Tsiang, on his way to Kāmarūpa (about
Kusī, an Eastward A. D., 638), crossing a great river, which
Channel.

General Cunningham (Ancient Geography of India, I. 1871, page 501) infers was the Tistā, which is hardly a great river, nor is it likely to have been such in past times, looking at its restricted mountain drainage. Then the early Muḥammadan Sultāns of Bengal encountered a large river in their expeditions against Kām-rūp and Bhūtān, in the first half of the 13th Century,¹ and Husain Shāh (1499-1520) also had to cross a large river on his way from Gaur to Kām-rūp. Dr. Hunter in his statistical account of Bogra, says, “Tradition, and the present condition of this District, and of Pabna and Rangpur, to the south and north, show that a great river did once flow

¹ Stewart's History of Bengal, 1813. Pages 46-66, Etc.

in or near the present bed of the Karatōyā, a river of such size that it gained a reputation for holiness, as we learn from the *Purāṇas*, scarcely second to the Ganges. To this day, the natives who live on the banks of the Karatōyā, say that their river is the old Brahmaputra. In M. Van den Brouck's Map of Bengal, which dates from about 1660, the Karatōyā is distinctly marked as a very great river, and as connected with the Brahmaputra." The theory about the Karatōyā being an old bed of the Brahmaputra could only apply to its lower reaches, and the evidence about its great sanctity, in ancient times, is not borne out by the present reputation of the latter river. The Kusī, or Kauçikā, is, on the other hand, invoked and worshipped by all Hindūs, especially those of Central Bengal, to this day.

In support of the theory advanced by Dr. Hunter, that the Kusī of remote times broke away eastward, in part, along the present bed of the Parwān, or by areas of iron slag. Panār (this river has a variety of names in different parts of its course), through the marshes of South Dinājpur to join the Brahmaputra, we have the occurrence of large quantities of iron slag lying in patches, mostly along banks of rivers, all to the northward of this very ideal line the river is surmised to have taken, as far, at all events, as Tājpur Pargana. Near Forbesgañj Station, of the A.-B. S. R., several miles of the line is ballasted with iron slag obtained from near the banks of the Parwān. Again; from a point (43rd mile-post) a little north of where this river crosses the Ganges and Darjiling road, for about 50 miles north-ward, that road is metalled with iron slag found locally; and again, where the Dinājpur section of the A.-B. S. R. passes through Pargana Tājpur, we find the line ballasted with the same iron slag from Raigañj to Rādhikāpur. This iron slag abounds in many localities in the District, forming mounds in places, and being covered up with earth in others, but occurring only to the north of this ideal line. No indigenous iron ore being found in the District, it seems tolerably certain that it was brought down from the Nepal mountains along such rivers as were convenient for the purpose, and appearances indicate that, probably, there was a barrier beyond which the traffic did not extend, or else all traces of slag from these regions have been swept away or covered up. It seems not unnatural to suppose that such a barrier was a large river into which flowed the streams which brought down the iron-stone, in addition to that carried down its own channel, and that the hill men, who were probably the smelters, confined their operations to the safer side of the river. Then, when the Kusī flowed here, it would be in the palmy days of Gaur, whose demands for arms and ironware might have originated

and maintained these iron-works, which, there is evidence to show, were carried on, on an extensive scale.

As far as I can follow Dr. Hunter, the original course of the River as suggested by him, agrees in the main with that indicated by Dr. Hamilton as far as Tājpur Pargana, but from this point the former takes it along a more northerly course into the Kāratōyā, whilst the latter takes it farther south into the marshes north and east of Māldah Station (the District did not exist in those days), and thence away to the Brahmaputra. Dr. Hunter's theory seems the more likely of the two, as being based on some evidence and it will be shown lower that these "great lakes, north and east of Māldah," were probably formed by a subsequent movement of the Kusī.

<p>Mr. Ferguson's Eastern Kusī.</p>	<p>Mr. Ferguson, as we have seen, considers the ancient Eastern Kusī to have discharged its waters through the rivers Atrai and Urasāgar, into the Brahmaputra.</p>
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<p>Dr. Hunter's Kusī of about A. D. 1600.</p>	<p>The next bed of the Kusī, and probably there were other channels occupied between this and the hypothetical course just described, suggested by Dr. Hunter, is supported by the evidence of the distinctive Bengali and Bihārī eras, whose line of division at the time of introduction would most probably be carried along a natural boundary such as a large river. There are numerous large and deep <i>Jhīls</i>, or extensive pools along this tract of country which seem the work of a large river. This hypothetical course of the Kusī would also throw light on a point on which there has been much speculation and controversy, <i>viz.</i>, the causes of the abandonment of Gauṛ to which here I can only casually refer. This Kusī would pass through the Kalindrī, a deep and wide channel still known as the Marā Kusī, and would strike direct against the northern suburbs of Gauṛ, and we see numerous embankments to the north and east of this ancient city meant to keep off the floods. Abū-l-Faẓl, in his Aīn-i-Akbarī, alluding to the vast swamp to the East of the city says, "Were the dam that confines it to break, the city would be under water." The flourishing capital of a large kingdom could not originally have been built in a swamp. As a matter of fact it is built on a ridge of yellow clays, with <i>Kaṇkar</i> here and there, which probably forms the outcrop of some of the infra-trappean beds of the Rājmahāl hills, and can be traced from Manihārī, through Gauṛ, and thence through the Borine of Rājshāhī towards Maimansingh. With</p>
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<p>Deflection of Kusī probable cause of insalubrity of Gauṛ.</p>	<p>the Kusī flowing to the north and east, and the Ganges washing its western walls, it is easy to understand how the city became</p>
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pestilential and uninhabitable. Gaur was finally abandoned in favor of Rājmahāl as the seat of Government in 1592, or about the time the Kusī is supposed to have flowed along this channel and the numerous marshes near Māldah would form a necessary concomitant to the Kusī in this position.

Returning now to where the Kusī leaves the Mountains, we see that, as a result of its extensive mountain drainage, a vast quantity of detritus is thrown out into the plains below Catrā and keeps constantly increasing and raising the detrital talus, or minature plateau, formed round its debouchure from the mountains, and along this plateau the Kusī waters run with great velocity and at a high level, as compared with the surrounding plains. The Railway Surveys of the Assam-Bihar section of the E. B. S. R., and the Bengal North-Western Railway, which are connected by a ferry across the Kusī, about 5 miles below the Nepal frontier, show that from Acrā (*vulgo* Achra) Ghāt, on the east bank of the Kusī to Forbesgañj Station, a distance of 14 miles by the line in a South-Easterly direction, there is a fall in the surface of the ground of 29 feet and from Khanwā Ghāt, on the right bank of the Kusī, to Nirmālī—across the Bīr Bandh—a distance by rail of 32 miles in a slight South-Westerly direction there is a fall in the surface of the ground of 46 feet. A careful survey, with levels recorded, made by the P. W. D. in 1890-91, shows (1) that the fall along the left bank of the Kusī from Acrā Ghāt to the village of Pithoriā, a distance in a straight line of about 10 miles, is 29·33 feet; (2) that the high banks of the Kajrī, or Kālī Kusī, or main Kusī of 1731, which flows about 10 miles to the east of Acrā Ghāt is some 10 feet below the level of the bottom or bed of the present Kusī; and (3) that Dēbīgañj Station, on the left bank of the Kusī of 1807-10 is about 5 feet below the level of the bed of the present Kusī, lower ground intervening between these two rivers.

Captain Jeffreys, in his report on the Gaṇḍak Canal, remarks “In Bihār it is characteristic of all rivers north of the Ganges that they run on ridges of high ground.” The Kusī is so conspicuous in this respect, at

Banks of Kusī forming a water-shed. the present time, that it admits of no affluents in the plains, in fact, its banks form, as it were a water-shed between the rivers of the Districts of Purneah and North Bhagalpur near whose line of division the Kusī at present flows during a good portion of its course in the plains. All the rivers in the South-Western half of Purneah, taking their rise from the eastern slopes, and those in North Bhagalpur, mostly from the western slopes of the main Kusī banks; and it is worthy of notice that all the mountain water the Ganges receives through the various tributaries

flowing into it within the limits of Purneah District has previously passed through the Kusī. It seems extremely probable that all the rivers in both the above districts having their sources in the Kusī slopes have at one time or another formed the main stream of that river. We have seen that it has occupied all the Purneah rivers as above restricted, save the easternmost, *i.e.*, the Panār or Parwān, as it is called in the north and it is significant that this river also in its short course in Nepalese territory is called the Būṛhī Kusī *i.e.*, the old or mother Kusī, and it is through this channel that Dr. Buchanan Hamilton conjectures that the Kusī broke away eastwards towards the Brahma-putra; but he also mentions, as being told by a gentleman, who had

A possible Eastern Channel of the Kusī at the foot of the hills. repeatedly visited the spot, that a dry stony-bedded stream flowed away eastward from below the third Cataract at Catrā, and

“alleged by the people of the vicinity to be the original channel of the river.” This stream might be the one referred to by Dr. W. Hunter as entering the District where the Bakrā now does break away eastwards. If such a former channel still exists it may possibly be found, if search were made, in the sandy plains containing antelope (*antelope cervicapra*) occurring to the North-east of Simrāhā, in Nepal, or the channel might be only a partial deflection of the stream as, indeed, Dr. Hamilton’s description would lead one to infer that the “original channel” alluded to, had, in his opinion, its exit from Nepalese territory through the Būṛhī or Panār river. The bed of the Kusī, from its high bank to high bank near the Belkār Hills, is some 8 miles wide, containing numerous islands which have been formed by running and abandoned streams intersecting one another, and the maximum rise of the river

Width and maximum rise of Kusī near Nepal frontier. in these parts is only about 8 feet during the rains; whilst the Ganges rises 30 feet where the Kusī joins it. The distance from the Belkār Hills to the Ganges in a straight line is about 100 miles, and the fall in level along the river (Kusī) about 200 feet in this distance.

Probable solution of Westward advance. Here then, I think, we have a probable solution to the problem of this westward advance of the Kusī. Rivers do not originate along “ridges of high ground” but by annual deposits on their shores during flood-time, and blown sand, raise their banks, and their beds keep rising in unison, the accumulations of sand in their beds first beginning in their lower reaches where, owing to distribution, their currents get slack. The Kusī in its most eastward course would be controlled by the detrital slope along the foot of the Himālayas which would give the initial direction to the course of the river in its endeavour to reach

the ocean by the shortest route, and then each affluent from the northern mountains would tend to deflect her course farther and farther to the south. In this position the usual detrital accumulations would go on lifting the river above the surrounding country, until the ever increasing force of the current of overflow of its spill-waters, due to its constant elevation, would ultimately break—during heavy rain or unusually high freshets—a new channel for the river into the lower country which would naturally be in a direction away from the mountains whose own detrital slopes are ever on the increase. This new channel would undergo the same filling up process, and when the next shift took place the raised banks of the channel just previously deserted, would form a sort of barrier against the immediate return of the river in that direction, and a farther deflection away from the mountains would take place, and this “constant westerly movement” would go on until the limit was reached and further westward movement checked by the general slope seaward of the great Gangetic Plain. The Kusī has never been known to return eastwards to any of its deserted channels, but has been steadily advancing westward, the successive leaps forming as it were a series of terraces with the slope facing East. Denudations and the products of denudation have tended towards levelling off the former “ridges” along which the main waters of the river were carried along. That the Kusī must again come eastwards will be apparent to any one who gives the matter a moment’s consideration. We know the Kusī has moved westward through a space of about 60 miles, measured along the Ganges, since 1731, and that it cannot go up country much further. The summer level of the Ganges at Monghyr,

**Gradient of the
Ganges surface**

to the North of which the Kusī flows at present,
is 101·83 feet above mean sea level, whilst
at Sāhibgañj opposite to which the Kusī of

1731 discharged its waters the summer level of the surface of the Ganges is only 68 feet above mean sea level. It is apparent that this “constant westerly movement” is not taking place for the special benefit of our Government, but must have been repeated over and over again in past geological ages since the upheaval of the Himālayas and the gradual formation of the Indo-gangetic Plain, and when the eastward movement is again accomplished, it may be in the power of distant generations to repeat that the Kusī is remarkable for its “constant westerly movement.” As to the time and manner of its going eastward again, it is difficult and hazardous to form an opinion. Fergusson, referring to the period when he considers the combined Kusī, Mahānanda, and Atrai flowed through the Urasāgar, says,¹ “Were it possible, it

¹ Quar. Jour. Geo. Soc., page 245.

would be extremely interesting to know when this was the case *** that this should have occurred within the very limited range of the traditions of Lower Bengal induces me to suppose that the beginning of the Christian era is the highest antiquity that can be ascribed to such a state of things. It may be much later." If the Bīr Bandh, to be next described, is the limit of a former westward advance of the Kusī, then another limit has again been nearly reached, as we have only the rivers Parmān and Talābā in Bhagalpur as possible future streams, the sources of the Dīmrā and Tiljugā being cut off from the Kusī by the Bīr Bandh. It is, however, possible for this embankment to be cut away by erosion of the right bank of the Kusī, north of where the B. N. W. R. line passes through it, but the current would have to cut through several miles of forest country before accomplishing this. The Kusī floods already find their way into the lower reaches of the Parmān.

In North Bhagalpur there is an extensive embankment of earth in places some 20 to 30 feet high, called the **Bir Bandh.** Bīr Bandh, extending from the foot of the Belkār or outer range of hills in Nepal southwards into Bhagalpur District, about 50 miles in length, it runs nearly parallel with the present course of the Kusī which approaches it towards its southern end. Dr. Buchanan Hamilton and others considered it to be a fortification, a theory shown by Dr. Hunter to be highly improbable, but it may possibly be a dyke to prevent Kusī overflows from flooding the lower country to the west and carving out fresh channels. It shows signs of having been cut up and partly washed away in its lower course by river action, which may have been done by the Kusī during a former westward advance. Dr. Buchanan Hamilton conjectures that this earth-work was constructed by Lakṣmaṇa II, about the close of the 12th century, the only reasons assigned for the supposition being that tradition stated it to have been built by a Lakṣmaṇa and "as the works were never completed and have the appearance of having been suddenly deserted, it is probable that they were erected by Lakṣmaṇa the second, who in the year 1207, was subdued and expelled from Nadiya by the Moslems." Probably he refers to the detached portions at its southern end, cut away by river action, when alluding to its incomplete and abandoned appearance. This extensive embankment cuts off the sources of the Dīmrā and Tiljugā rivers from the Kusī, and intercepts all flood-waters of the latter river from entering the channels.

As to the manner in which the change will take place we have the **Probable return of the Kusī to its easternmost alignment.** analogy of the behaviour of the Tistā river, under apparently similar conditions, to be next described. From the general aspects of the

gradients in the Kusī sub-delta, and the inference to be drawn from the straightening of the Tistā, it would appear probable that the Kusī, after reaching its westernmost limit, will go back to near the easternmost of its abandoned channels, and then begin the work of moving westwards all over again. In fact since these notes were taken, the Kusī, during the rains of 1893, made a great demonstration of going eastwards and threw such a considerable volume of water from below the village of Babbia into the Būrhi river, that a considerable tract of country on both its sides was flooded and covered up in places with 6 to 8 feet of sand, and the large villages of Harinagrā, and Dīwāngāñj, in Nepal, on the right bank of the Būrhi stream, were silted up and had to be deserted.

The Tistā river is known to have flowed through the Karatōyā, and to the East of this latter river there are other beds known as the *marā* or dead Tistā. In **Return of the Tistā to its easternmost abandoned channel.** Major Rennel's Bengal Atlas, published in 1781, the Tistā is shown running far to the west of the Karatōyā, *i. e.*, in the Atrai river, and flowing into the Padma or Ganges. This seems to have been the westernmost limit of the Tistā, though in remoter times it may have flowed through the Dhīpā and Purnabahā in Dinajpur, for in 1787, quoting from the Rangpur Collectorate records, Dr. Hunter in his account of that District says, "The Tistā, at all times an erratic river, had for long rolled its main stream through the western part of Rangpur and through Dinajpur till it mingled its waters with the Atrai and other streams, and finally made its way into the Padma or Ganges. At the same time it threw off a small branch in the northern part of Rangpur which found its way by a circuitous course past Ulipur to the main stream of the Brahmaputra, a little farther north than the place where the waters of the Ghaghat found an exit into the same river. Suddenly the main branch of the Tistā swelled by incessant rains, swept down from the hills such vast masses of sand as to form a bar in its course, and bursting its banks the Tistā forced its way into the Ghaghat. The channel of this latter stream was utterly inadequate to carry off this vast accession to its waters; the waters of the Tistā accordingly spread itself over the whole District causing immense destruction to life and property, until it succeeded in cutting for itself a new and capacious channel through which the river now flows. This great inundation occurred on the 27th August 1787, and on the 2nd September, the Collector reported to the Board of Revenue that, "Multitudes of men, women, children and cattle have perished in the floods, and in many places whole villages have been so completely swept away as not to leave the smallest trace whereby to determine that the ground had been occupied." These calamities culminated in a famine. Collections of

revenue were suspended for a period of two months, and provision was made for feeding the starving poor who were daily flocking into the town. "Upwards of 6,000 poor were, at this time, in receipt of daily rations of rice at the Civil Station *** It was estimated that in the course of this disastrous year, Rangpur District lost one-sixth of its inhabitants. In pargana Pangā, half the population were gone."

Fergusson, alluding to this new course adopted by the Tistā, says, "The curious part of the matter is that looking into Rennel's original M. S. Surveys, a chain of ponds is marked in this direction as the old bed of the Tistā," too insignificant to be marked in his Atlas, but at their junction with the Brahmaputra he does mark 'Teesta Creek.' To those who know how permanent the names of rivers are, this is proof positive that the river once before flowed in this direction, but unfortunately we have no knowledge when it deserted this bed and became a confluent of the Atrai."

Thus a comparatively small river, whose mountain drainage is confined to a portion of Sikhim, has proved capable of dealing destruction over a large tract of country in its eastward return; and the Tistā is not singular in this respect, there being rivers in other countries which are reported to carry destruction with their movements. Thus Mr. Woodville Rockhill, the American Central Asian traveller, writing in the *Century Magazine* says, "On the banks of the Huang-ho, a little to the west of where I crossed it, comes yearly an official to sacrifice in the name of the Emperor to the river god, that he may spare the country through which it flows and not visit it with death-dealing floods * * * Evidently little faith is placed in this mode of restraining the fury and vagaries of the great river which within the historical period has four times changed its lower course and yearly breaks through the immense levees along its banks. The most recent change was in 1887, when it swept over more than a hundred thousand square miles of country in the Provinces of Honan and An-hui, obliterating innumerable towns and villages, and dealing death to hundreds of thousands (report says millions) of people."

Now if we return to the Kusī and examine all its abandoned channels lying to the east of its present course, we can see that not one of them, except perhaps the one last deserted, is capable of containing a fraction of the waters brought down by the main river, and extensive and severe floods are sure to occur along whichever channel it adopts in its retreat back towards the sea. With an eastward direction of flow, as indicated by Drs. Hamilton and Hunter, it would intercept and absorb

Changes in the Course of the Huang-ho.

Channels inadequate for carrying main Kusī waters.

the waters of all hill streams that at present drain into the Mahānanda which river itself when it came to deal with the raised banks of the new Kusī would probably break away and join the latter river farther to the south-eastward, through one of those rivers starting from the neighbourhood of its left bank which have in former times, probably, formed the bed of its main stream. In this connection Mr. Fergusson, alluding to the westward advance of the Kusī, remarks :¹ “It shows a great tendency to go farther in this direction, in fact, to imitate the example of its old confluent the Mahanuddee, which forms a circle extending 35 miles to the westward of the straight line in which we may reasonably suppose it reached the Ganges at no very distant date.” The Mahānadi appears to have now reached its farthest westward limit and with minor local deflections has been practically stationary in its present course within the memory of the present generation, and the eastward movement will probably be into its easternmost supposed channel, the Tanghan river, or possibly further east. Thus the Kusī in its new course would go on increasing in dimensions and in force and would form in the neighbourhood of the Brahmaputra an immense river.

On approaching the banks of a newly-adopted channel of the Kusī, when it has been established for a few years, its vicinity can at once be suspected by seeing forests of large trees, which had formerly been growing on the highest class of lands, their stems silted up to their forking branches, gradually dying off, and the whole country covered with sand or clay deposits as the current has been swift or slack, and most of the higher arable lands converted into jungles of tall saccharum grasses and tamarisk (*Tamarisk indica*). On the other hand, a broad belt on either side of a recently deserted channel is rendered conspicuous by the absence of all large trees except occurring as an oasis, spared here and there, dotting the prairie of waving grasses. When Dr. Buchanan Hamilton visited Purneah in 1807, Dhāmdāhā Thanā was one of the most populous and prosperous divisions of the District to the west of, and almost untouched by, the Kusī, whilst Gōndwārā Thānā to the east, recently overrun by its ravages, had wild elephants roaming in its jungles. At the present time the former is just recovering from the state of being more or less a treeless tiger jungle, and the latter is the most cultivated and wooded of the three parganas of the Mahārāja of Darbhanga's zamīndārī of Dharampur, the exploiting ground of the Kusī in Purneah for the past century. Captain Jeffreys in his report on the Gaṇḍak canals, referring to rivers in Bihār north of the Ganges as quoted in Dr. Hunter's “Bhagulpur,” says, “Between two adjacent rivers there will be found a shallow

depression consisting of a series of *caurs*, or low lands, leading into one another." This is the case with all the abandoned courses of the Kusī and it is these very shallow depressions, or *caurs*, which the Kusī works into and carves out new channels on a return to the locality. In the case

Rate of silt accu- of the Hiran, or main Kusī, of the surveys of
mulation. 1840–47 its channel is now nearly obliterated ;

its former course in places being marked by a high ridge, and when the Kusī next re-visits this locality it will flow along the *chaurs* flanking the original course of the river of 1840, and the present low lands will become in part the high banks of the future river, and *vice versa*. To give an instance, Nipaniā, situated between beds of the Hiran and Dhāmdāhā Kusī about 30 miles above where these rivers fall into the Ganges, was a working indigo factory belonging to a brother of mine, and obtained its water supply from an artificial tank upon the raised banks of which stood the dwelling-house and masonry outworks. I saw it in working condition in 1869, and on my re-visiting the spot in 1877 no trace of the tank or indigo vats could be seen, but the upper portion of the boiler building with chimney stood out from the sands, marking the spot round which the factory compound and works formerly stood, the place having been covered up with about 10 feet of sand by a turn in the flow of the Hiran, just previous to the Kusī abandoning this river and going into the Daus swamps.

The great changes that have occurred in the courses of the Indus and other Pañjāb rivers in the western half
Changes in the of the Indo-Gangetic Plain are well known,
Panjāb Rivers. though I believe they have never been syste-
matically worked out.¹

It is well known that the Ganges or Bhāgīrathī in former times
Bhagirathi the real flowed past Suti or Sontī in the Murshidābād
Hindu name of the District into the sea through Diamond Har-
Ganges. bour, or along the direction in which the Huglī
now flows, and this is the river up to the present day regarded by the Hindūs as their sacred Ganges, or Bhāgīrathī; and the portion of the Ganges called the Padda or Padma, between Sontī and its junction with the Brahmaputra, at Jāfirgañj, is not held sacred. It is important to bear in mind that the real name of the Ganges from Gangōtrī near its source in the western Himālayas to Sāgar on the sea is the Bhāgīrathī, and the word Gangā simply signifies *river*, and as applied to the Bhāgīrathī means *the river par excellence* of the Hindūs.

¹ [See, however, Major Raverty's Article on the Mihrān of Sindh, appearing as an Extra number of the *Journal* of the Society for 1893. Ed.]

Fergusson¹ alluding to this says “Poddah or Padma (Lotus) is the stream running nearly east and west by which the Bhāgīrathī,

The Padma. or true Ganges, above Bauleah at some recent time connected itself with the Brahmaputra somewhere above Jāfirgañj. The tradition of this junction taking place is quite distinct in the minds of the natives inhabiting its banks, who do not consequently look on the Poddah as a sacred stream.”

Now if we examine the Sea-board of the Gangetic Delta at the head of the Bay of Bengal, we find three indentations or arms of the

Three large Estuaries in the Seaboard of the Gangetic Delta. sea larger, and running deeper into the seaward face of the Sunderbans than the rest of the creeks. These are, beginning from the west:

(1) The mouth of the Huglī, or Ganges proper; (2) The Harinaghattā Estuary; and (3) The Megnā Channel, at present the outlet of the Ganges, Kusī, and Brahmaputra combined.

At about the time the main Ganges flowed into the sea by the **Kusī probably flowing through the Harinaghattā Estuary.** first of these channels, and the Brahmaputra, flowing past Maimansingh, joined the Megnā, (as it is well known that the Brahmaputra came into the portion of its present channel lying between Dīwāngañj and Jāfirgañj, about the beginning of the present century), and found an exit into the sea through the third channel, we have the Kusī probably flowing eastwards towards Pabna, and it seems not unlikely that the Harinaghattā is the channel by which the Kusī waters, swelled by many of the tributaries at present flowing into the Brahmaputra, found their way into the ocean. This would account for the great depth and size of the Madhumatī river, and the extent of the Harinaghattā Estuary.

Describing the seaboard, Fergusson says,² “From the Hugly to the **The Seaboard of the Delta.** Harinaghata, the seaward face of the Sunderbuns is tolerably level and fixed, at all events it has undergone no sensible change within

any period to which our knowledge extends, and so far as can be ascertained, it shows no tendency to go forward. In that portion of the Delta, however, allotted to the Brahmaputra a great deal of work has yet to be done, everything there is so new and in such a constant state of change.” At the present time all the three great rivers have combined their labours, and are using their united efforts in building up the backward—hence comparatively lower—portions of the Delta in the eastern part of the Bay, by depositing the greater portion of their

¹ Quar. Jour. Geo. Soc., London, Vol. XIX., 1863.

² Quar. Jour. Geo. Soc., page 334.

silt along the Megnā outlets; but a time must surely come when it will be the turn of the Huglī and Harinaghāṭṭā to work on their own portions of the Delta already advanced so far into the sea, and now enjoying a period of rest, and what combination of physical events may bring this about, it is our province to enquire into.

Now, referring to my allusion in the introduction, to remoter dangers of a serious nature, we have Dr. Buchanan Hamilton's opinion that when, in its westward advance, the Kusī came across and joined the Bhāgīrathī below Sontī.

Eastward flow of Kusī will probably open out the Bhāgīrathī below Sontī. Bhāgīrathī, "the united mass of water opened up the passage now called the Padma and the old channel of the Bhāgīrathī from Sontī to Nadiyā was then left comparatively dry." This seems likely enough, but the converse appears still more probable, that is, upon the Kusī breaking away eastward again and deserting the Bhāgīrathī, the latter river will return to and resume its old course and flow into the sea through Diamond Harbour. To quote Fergusson again, he says,¹ "The first result of the invasion of the Gangetic territory by the Brahmaputra was that it should seek to re-enact the part which had just been performed on the other side of the Madhoopur jungles, and should threaten to shut up the Ganges and send it back through its own distributaries. It was so nearly successful that in 1838 the great Ganges was fordable at several places above the junction." Now, if the detritus brought down by the new channel of the Brahmaputra nearly closed up the bed of the Ganges in 1838, it appears more than probable that that event may actually occur upon the Kusī joining it through, probably, the Urasāgar River after over half a century of silting up and raising of the country round the junction of the three rivers.

With the main stream of the Ganges turned into the narrow channel of the Huglī it appears tolerably certain that Calcutta, and many of the towns along the banks of the Bhāgīrathī would be rendered untenable.² Further, the vast increase in its waters would cause its banks to overflow and sand and clay deposits would take place over a wide area, and the silting up and devastation caused by a shift westward of the Kusī, above described, would be re-enacted on a

Danger to Calcutta from Hugli becoming Main Ganges.

¹ Quar. Jour. Geo. Soc., Page 336.

² [The reader is again referred to the Proceedings for February, 1895, in which this opinion is discussed. It is hardly necessary to point out that the author is dealing with results which may occur if engineering science does not interfere. The discussion above referred to shows that engineering science has interfered. Ed.]

larger scale on the lands flanking the Huglī, which river itself would then—as the Ganges—probably shift about into adjacent channels. Another interesting question now crops up from this state of affairs.

We have all read of the celebrated Calcutta Bore-hole, a boring in search of pure water carried to a depth of 481 feet, or about 460 feet below mean sea level, at Fort William, in 1835. At a depth of 25 feet a carbonaceous sandy clay was met with, which gradually passed into a bed of peat at 30 feet, or about 10 feet below mean tide level.¹ This peat bed has since been found in all excavations in and around Calcutta at depths varying from 20 to 30 feet, and it is admitted by Geologists that there is little doubt that this was an ancient land surface, as wood and roots of the *sundri* tree (*heritiera littoralis*) and other vegetable remains occur in the peat. Now it seems not unlikely that the present surface of the ground, in suitable localities, after such a catastrophe as above surmised, would present to future generations such a stratum as the first peat bed encountered in the Calcutta Bore-hole. It might be brought forward as an argument against this theory that the peat occurs at, or a few feet below, mean tide level, but we must remember that the rank vegetation from which the peat had its origin must have grown in soft low-lying grounds, such as the Sundri trees grow in now, and in a flooded state of the country the extra pressure resulting from the higher level of water and silt deposits, with loose semi-fluid quicksands, some 30 feet in thickness, as encountered in the Bore-hole underlying the peat at no great depth, would be sufficient to settle the peat-bed a few feet below water level, especially as the whole country would be saturated with flood waters. In fact it seems probable that a general settling down of all the alluvial strata along the seaboard would be the natural result of such a condition of things. It would be extremely important and

Old Course of the Bhāgirathi. interesting to know when the main Ganges, in past times, last flowed through the Diamond

Harbour Estuary. The native tradition is that the original Bhāgirathī formerly flowed into the Estuary through the opening now occupied by the Rūpnarain, and Fergusson² thinks the tradition is right, and as above quoted, he also considers that the main Ganges deflected into the Padma channel “at some recent time.” In the map of Bengal, pub-

De Barros’ Map. lished in the “Da Asia” of the Portuguese historian, De Barros, during the latter half of

¹ Jour. As. Soc. Beng., IX., 686 (1840), also Geology of India, R O. Oldham, 1893, page 432.

² Quar. Jour. Geo. Soc., London; Vol. XIX., page 340.

the sixteenth century, as given by Wilson,¹ the Padma is already shown as a wide and established stream, but the present Bhāgīrathī is shown as throwing a narrower branch off westward and flowing into the Estuary in the neighbourhood of the outlet of the Rūpnarain, and to this western channel probably the Dāmūdā, alluded to by Wilson,² was an affluent. In the map the name Huglī is not mentioned, but that river is called the Ganges, no town or village is marked where we should expect to find Calcutta, but Sātgaō, spelt Satigam, near the modern Huglī, is shown higher up the river and formed the trading mart of the Portuguese in those times, and there was sufficient water for the larger vessels to come up the river as far, at all events, as the present site of Calcutta and for the smaller vessels to go right up to Sātgaō. Now if tradition is to be trusted in this instance, and De Barros' map has been correctly interpreted by me, then it would appear that the original Bhāgīrathī which flowed into the sea near the Rūpnarain opening, had been then already deserted, and the deeper channel was the present Huglī. That a wide deserted channel can be silted up and obliterated in the short space of twenty years, we have seen in the case of the Hiran, and to those who have watched the process it is easy to understand, and that the old channel of the Bhāgīrathī should have disappeared after a lapse of three centuries is in no way surprising. In the same way that the Ganges probably broke away into the Padma, owing to the accession of the waters of the Kusī, the sluggish Bhāgīrathī after the withdrawal of the bulk of its waters was unable to keep clear the major stream, and to prevent it from silting up, and contented itself with the minor bed of the Huglī. The curious coincidence of the "Da Asia" being published just about the time Gaur became unhealthy and pestilential, which I have surmised to have been due to the Kusī coming into the Kalindrī, *i. e.*, leaving its eastern courses and coming into the Ganges, which then flowed under the western walls of the old city, may be noted. According to Wilson, the "Da Asia" was published in parts, from 1552 to 1613, and the seat of Government

**Final abandonment
of Gaur.**

was removed, owing to insalubrity, from Gaur to Tandā, by Sulaimān Shāh in 1564-65, and ten years later the great pestilence broke out which depopulated Gaur, which was finally abandoned in favour of Rājmahāl in 1592. It was about this time, according to Hunter's *Māldah*, that the Ganges ceased to flow under the walls of Gaur, and this would be the natural result of the Kusī deflecting it westward. From

¹ Topography of the Huglī in the 16th Century, by C. R. Wilson, Jour. As. Soc. Beng., Vol. LXI., 1892.

² Jour. As. Soc. Beng., Vol. LXI., 1892, note, page 112.

all these aspects of the case it would appear probable that the Ganges turned away eastwards during the first half of the 16th century, and the probability would amount almost to certainty if we were to admit that the western channel shown in De Barros' Map is the original Bhāgīrathī, as it must have been recently vacated to appear so conspicuous.

In conclusion, I would beg to remark that the whole subject is a vast and interesting one, and only the more prominent features have been here touched upon with a view, principally, of pointing out the probability of the Kusī and Ganges changing their courses, and the attendant dangers, and from the evidence adduced I think we are fairly entitled to conclude that both these catastrophes are certain to occur in the not distant future.

Two points of special interest to Geologists crop up from these investigations. The first is that we here see **Formations similar to Sussex Weald, in progress in the Delta.** vast fresh-water beds of sand alternating with clay, with here and there thick deposits of fresh-water Shells in the *Cauris* (*vulgo, Chowrs*) or lagoons forming far inland by the action of rivers; whilst in the newly forming portions of the Delta itself we may expect to find areas of strata containing marine organisms alternating with fresh-water, or estuarine beds, without the aid of general up-heaval or depression of the country. This throws somelight on the probable mode of formation of the fresh water and fluviomarine beds of the Weald of Sussex, a subject of such controversy amongst English geologists.

The second point of interest is that beginning at the Manihārī Hill, **High ridge of Country connecting Rāj-mahāl with Assam Hills.** in the Purneah District on the left bank of the Ganges, and going eastward and southward, a high ridge of country can be traced, with gaps here and there, right away through Gaur, the Borine of Rajshahi and Bogra through the Madhupur Jungles, away to the Assam Hills, between which and the Rājmahāl Hills it forms a sort of barrier between the Gangetic Plain and the Delta proper. The principal perforations or gaps in this ridge are, (1) the channel of the old Brahmaputra above Dīwāngañj; (2) The channel of the present Brahmaputra at Jafirgañj, which probably carried the Kusī at one time, and

Three gaps in the Ridge. (3) the channels of the Mahānanda and Ganges which are practically the same between Rājmahāl and the Borine, with the narrow Gaur ridge forming an island in this opening. This ridge is composed of limestone, *kaṇkar*, and brightly-colored variegated clays in the case of Manihārī Hill, and farther east of yellow and reddish clays with *kaṇkar* beds uncovered by the newer alluvium. Similar beds occur on the banks of the

Karatōyā and near Dinājpur, where Dr. Buchanan Hamilton¹ mentions the occurrence of *khurī*, or the white clay of the Rājmahāl inter-trappean beds in digging a well. In most places these beds are what are termed in geological works in India, the “older alluvium” but it is not clear by what process they came to cover the highest tracts of the country; but the influence of this barrier in checking the drainage of the country in the earlier days of the building up of the Gangetic plain and even probably now must be apparent to all knowing the distribution of the Ganges alluvium.

These three openings in this high tract of the country correspond to the three larger estuaries in the Three larger Estuaries correspond with 3 gaps in the ridge. pond to the three larger estuaries in the seaboard at the head of the Bay, above described, and knowing as we do that the flanking estuaries have been occupied separately by the two great rivers of Bengal, it seems but reasonable to suppose that there must have been a time when the Kusī, holding an independent course and absorbing the southern drainage of the Himālayas up to the eastern confines of Sikhim, passed through the central opening and flowed into the sea through the Harinaghāṭṭā Estuary, as a third great river of Bengal.

A map 50·9 miles to the inch, taken from Messrs. Keith Johnston's Atlas, published in 1894, with dotted lines indicating the various alignments of the Kusī—hypothetical as well as actual—is annexed.

¹ Description of the Dināpur District, Calcutta, 1833.

North Indian Folk-Lore about Thieves and Robbers.—By ÇARAT CANDRA MITRA, Corresponding Member of the Anthropological Society of Bombay.

[Read July 1894.]

Every profession, not excepting even that of the light-fingered gentry, has its gods and goddesses, to whom the persons following that profession pay their homage for success. The vegetable-sellers of Bihār have their gods. The Kahārs (कहार) or palankeen-bearers, and the Mallāhs (मल्लाह), or boatmen of Bihār, also worship particular deities who, they believe, watch over their welfare and safety. Indian thieves and robbers, and the rest of the marauding fraternity, have also particular goddesses whom they worship in the belief that success or otherwise in their pilfering expeditions depends on the favors or frowns of those female deities. To this end, they take care to propitiate the said goddesses by offering up *pūjā* in the shape of sweets, cereals, and, sometimes even animal sacrifices, before starting on their expeditions. Curiously enough, a female deity is invariably found to be the tutelary patroness of the Indian robbers and thieves. She is known in different parts of Northern India, as the goddess Dēvī or Kālī in her various forms and under various names. In Bengal, thieves and robbers are supposed to enjoy the special protection of Kālī. In the North-Western Provinces and the Pañjāb, she is also worshipped by the light-fingered gentry under the name of Dēvī, or Mātā. The Thags, who raised the profession of robbery by throttling and strangulation into a semi-religious cult, also worshipped this Dēvī or Mātā, to whom they invariably paid their devotions before starting on their marauding expeditions, and from whom they drew omens portending the success or otherwise of their undertaking. Colonel Sleeman, well-known as the Superintendent of the operations for the Suppression of Thagi and Dakaiti in India, has given detailed information of the various rites practised by the Thags, and of their superstitions, in his work entitled "*Ramaseeana, or the Secret Language of the Thugs.*" The curious enquirer may also find additional information on the

subject, and gain peeps into the inner mysteries of a Thag's daily life in a work of fiction entitled "*The Confessions of a Thug*," by that well-known Anglo-Indian novelist, Colonel Meadows Taylor.

In Bengal, thieves and robbers are believed to enjoy the special protection of the goddess Kālī. Up to the time that the British rule was established on a firm footing in Bengal, *ḍakaitī* and robbery were rife in that part of the country. Before the *ḍakāits* started on their expeditions they used to offer up *pūjā* to the goddess to ensure their success, and, after returning from a foray, used to make her an offering of part of the booty by way of thanksgiving. It is said that, in those days, the temple of the goddess Kālī at Kālīghāṭ, south of Calcutta, and the temple¹ of the goddess Citreṣvarī—a form of Kālī—at Chitpore in the Northern Suburbs of Calcutta, were much resorted to by *ḍakāits* and robbers who used to worship their patron-deity there.

The shrine of the deity Tāraknāth—an incarnation of Çiva—at Tārakēṣvar (Tarkessur) in the Hugli District, has from time immemorial been regarded as a very important place of pilgrimage by the Hindūs of Bengal. At the present time, a branch line of the East Indian Railway has been opened from the Sheoraphuli station of that railway to Tārakēṣvar, which conveys the pilgrims safely to that shrine. But, in the pre-railway days, when the *Pax Britannica* had not been firmly established, almost all the pilgrims had to travel thither on foot or by bullock-carts. These pilgrims, in many cases, used to take with them rich and costly articles for offerings to the lord Tāraknāth. These excited the cupidity of the marauding fraternity; and a colony of *ḍakāits* had accordingly established itself near a village named Singur—now a station on the Tārakēṣvar Branch Railway—which was situated close to the highway which led to the shrine of Tārakēṣvar. These freebooters ostensibly led the lives of peaceful agriculturists by day time, but during the night, they would sally forth from their homes, armed with *lāṭhīs*, and prowling about the highway, would rob belated travellers of their belongings, and often murder them in order to get at their valuables. A place named *Kaikālār māṭ* (the maidān of Kaikālā—a village in that neighbourhood) was the scene of many of these atrocities; and, in those days, the very mention of the name of that place was enough to send a thrill of horror through the hearts of the pilgrims and wayfarers. These *ḍakāits* are said to have enjoyed the protection of a goddess Kālī whose temple is situated in the aforesaid village of Singur, and exists there to this day. They used to worship here before starting on their plundering expeditions.

¹ In this shrine, human sacrifices, it is said, used to be offered to this goddess in days gone by.

and, on their return, used to make valuable offerings out of the rich booty secured. This goddess was and is still known as *ḍākātē Kālī* or the goddess Kālī of the *ḍakāits*, and enjoys the reputation of having been the favorite deity of those marauders of Singur.

It is said that 'there is honour even among thieves,' and the *Dakāits* of Bengal were not wanting in this respect. Before they committed *ḍakaitī* in a person's house, they used to send an anonymous letter to the good man thereof informing him of their intention to do so. One night, they would gather together in armed bands, and, with lighted torches, invade the house. After reaching the place, they used to indulge in sword-play which they called *ḍhālī pāk khēlā* yelling loudly all the time. Thereafter they attacked the house. If they saw any danger of being captured, or if any of them got killed, they used to bawl out *māchī paṛechē* 'a fly has got caught,' and then cleared out of the place as fast as their heels could carry them.

In the Pañjāb also, the thieves and robbers used to sacrifice goats or sheep before, or made offerings of sweetmeats to, their *Dēvī* or goddess, in order to propitiate her and obtain the boon from her that they might be successful throughout the year in their plundering expeditions. On the occasions of such worship fairs were held. One such fair is held even at the present day at the village of Mansā *Dēvī*, four miles from Caṇḍigarh, on the way to Kālkā, in the Ambālā District. The following account of this fair appeared in the *Civil and Military Gazette* of Lahore, and was quoted in the *Calcutta Statesman* of Wednesday, the 18th April 1894.

'*An Ancient Thieves' Fair.*—Another Fair has been held in the Ambālā district at Mansā *Dēvī*, four miles from Caṇḍigarh on the way to Kālkā. Owing to the zemindars being engaged in cutting their harvests, and the Hardwār and Amritsar Baisākhī Fairs being on at the same time, the gathering was unusually small. For all that, however, there were some 20,000 people present. *This was in days gone by essentially a Thieves' Fair, in which the robbers made their offerings of goats, sheep, or sweetmeats at the shrine of their dēvī or goddess, and prayed that they might be successful throughout the year in their various plundering expeditions.* At the present time the ceremony is a novel and pleasing sight. The men and women are all dressed in their gorgeous holiday attire, and, having made their offerings, they gather together in lots and sing, dance, and make merry, generally for a couple of days when they leave for their homes after a dip in the well-known Gaggar, a stream which appears to be sacred to the hill people.'

In Bengal, it is popularly believed that in many cases thieves elude detection and capture because the goddess Kālī has granted them the

boon of protection from all danger *cōr'dēr upar Kālīr bar āchē*. Thieves almost always commit thefts during the dark half of the moon—the worship of the goddess Kālī taking place on the 15th day of the waning period of the moon. There is a popular superstition amongst the Bengalis that if a male child be born on the *amāvasyā*, or the 15th day of the dark half of the moon, the child will become a thief, as that day is consecrated to Kālī—the goddess of thieves and robbers.

Bengali and Bihārī burglars (*sindhēl cōr*) are said to get their iron hooks (*sindh-kāṭī*)—instruments with which they make holes in the walls of buildings for the purpose of effecting their entrance therein, and which are the prototypes of the 'jemmy' of European burglars—manufactured in the following way. A burglar secretly goes to an iron-smith's (*lohār* of Bihār and *kāmār* of Bengal) shop during the night, and there deposits a piece of iron, and some pice by way of wages. In the morning, the iron-smith, finding the iron and the pice, understands that they had been left there by some thief with a view to have the same turned into a 'jemmy.' The ironsmith manufactures it accordingly and, during the night, deposits it at the exact spot where the iron had been left by the thief. The thief comes thither secretly during the night and takes it away. Hence is the origin of the Bengali saying *cōrē kāmārē dyākhā nāi* or *cōrē kāmārē sākṣāt nāi* (there is no interview between a thief and a blacksmith). This saying is often cited when speaking of a person who gains his object or performs a certain act without having a personal interview with the person who has the power to grant that object, or to whom he is in duty bound to perform that act. Hence it is popularly believed that thieves and burglars never commit thefts in ironsmiths' houses, out of gratitude to the latter. It is another instance of 'honour among thieves.'

Thieves play an important part in the proverbial philosophy of the Bengali people. When one person of bad character is likened to another of the same description, we say *cōrē cōrē mās'tuta bhāi* or thieves are cousins (mother's sister's sons) to one another. When one person defrauds another of his ill-gotten gains, the former is said to practise *cōrēr upar baṭ'pārī* or fraud on a thief. *Cōr palālē buddhī bār'hē* or 'shutting the stable door after the steed is stolen,' is applied to persons who become wise after the event. Thieves, when caught red-handed, are often thrashed within an inch of their very lives. Hence *cōrēr mār* or 'a beating administered to thieves,' is proverbially synonymous with a severe thrashing. If a person is severely thrashed, it is said of him *tā kē cōrēr mār merechē* or that he has been thrashed like a thief. A child possessed of mischievous habits is often dubbed with the pet sobriquet of *ḍākāt* or dacoit. If a person seeks for an opportunity

of doing a certain act and gets it at last, it is said of him *cōr cāy bhāṅgā bēṛā* 'a thief seeks for a broken fencing.' A thief may elude detection for some time, but he is sure to be caught one day. This has given rise to the popular saying *cōṛēr pāc din, sādher ek din*, or a thief may escape scot-free for five days, but the good man of the house will catch him one day. Thieves are always artful dodgers, and, in allusion to their artfulness, the Bengalis say *cōr bidyā bara bidyā, jadi nā parē dharā* or that the profession of stealing is a paying one, so long as the thief is not caught. A person who steals trifles is spoken of as being a *chiñc'kē cōr*. If sound advice is given to a person, but he does not act up to it, the proverb *cōṛā nā ṣunē dharmmēr kāhinī* (preach the gospel to the devil, and he will not hear you) is applied to him. A thief cannot be detected except with the assistance of a thief. Hence the proverb *cōṛēr sandhān jāsu*, or 'set a thief to catch a thief.' A servant or any other menial, who is notorious for his thievish propensities, is often spoken of as being a *cōṛēr sardār*, or 'chief among thieves' or 'arch-thief.' If a person, without making any attempt at concealment, deprives another of a thing or otherwise defrauds him, the former is said to commit *dinē ḍākātī*, or 'robbery by broad daylight.' A Bengali bridegroom is often likened to a thief *bar nā cōr* because the former has to put up patiently with all sorts of liberties which the female members of the bride's family take with him on the day of his marriage, just as a thief, when caught, patiently suffers the maltreatment which he receives at the hands of his captors. Or this saying may refer to the form of marriage by capture prevailing in primitive communities, whereby a person has to steal or carry away by force a woman before he can marry her. The saying *cōr kē balē curī kar'tē, grhastha kē balē sābadhān hatē* is often applied to a person who blows hot and cold in the same breath, that is to say, who tells a person to do a certain act with respect to another person, and, at the same time, tells the latter to beware of the former.



Origin of the Baloch.—By COLONEL E. MOCKLER, *Political Agent, Muscat.*¹

[Read November 1893.]

Professor Rawlinson derives the name of the “Baloch” from Belus, king of Babylon, who is identified with Nimrod, the son of Cush, and says that “the names of Belus and Cush, thus brought into juxtaposition have remained attached to some portion or other of the region in question from ancient times to the present day. The country East of Kirman was called Kusem throughout the Sassanian period. The same region is now Beloochistan, the country of the Beloochees or Belus, whilst adjoining it to the East, is Cutch or Kooch.” With the name of Cush may be yoked “Kech” (the capital of Makrān), “Kachī” (a province of Baloochistan) and “Cashmere”; and, as the Sindhis call the Baloch, “Barōc”, “Kach and Baroch” (Cutch and Broach of our maps) may be linked together.

The country now called Balochistan was called by the Greeks “Gedrosia” and was inhabited on the seacoast by the “Ichthyophagi” (fish-eaters) and on the North-West by the Paricanii, Utii, Maki and other tribes. One of the tribes or clans now inhabiting it, viz., the Rind tribe (whose name signifies a “turbulent, reckless, daring man”)—which, it may be noted, has never acknowledged the authority of any ruler in the country, and each individual member of which professes to owe obedience to no one, so that the tribe has no recognised head—assert that they originally came from “Alaf,” which is supposed by themselves and most other people, I fancy, who have heard their tradition, to be Haleb or Aleppo in Syria. They say that they are Arabs of the tribe of Quraish and were forced to the number of 40,000 to emigrate from “Alaf” by Yazīd I, for having rendered assistance to Husain “the martyr,” nephew of the prophet Muḥammad, in A. H. 61. There is a popular ballad well-known throughout the whole country to that effect which, however, states that from “Alaf” to Makrān

¹ [This article has not had the benefit of revision by the author. Names of well-known places and tribes are given in the conventional spelling of the maps. Thus Baloch and not Balōc. ED.]

they travelled between "earth and heaven." The name of not one single place between Aleppo and Makrān, as having been halted at by the 40,000 Rinds who are said to have left "Alaf" in a body is preserved, so far as I am aware, in any tradition in the whole country, although, from the Western border of Makrān itself, from the seacoast to some 150 miles inland, their movements eastwards are minutely recorded in various ballads and oral traditions. These Rinds claim to be the true Baloch, and to one of their ancestors named Jalāl Khān, or rather to one of his sons, whose names are made to suit the exigencies of each clan, the pedigree-makers of almost every clan in Makrān, claiming to be respectable, are pretty certain to trace their clans' descent. Pottinger records the fact that, in his day the Brahuis (who are Dravidian Cushites) claimed descent from the earliest Muḥammadan invaders of Persia, by whom the Rinds are doubtless intended.

The Kalmatīs of Kalmat (the Kalama of Arian and others) make a man named Kalmat their ancestor, a Rind, and one of the four sons of Jalāl Khān. Some of the genealogists of the great Hōt or Ōt tribe also, whom I identify with the Utii of the army of Xerxes (though many in the tribe, and most out of it, deny any connection with the Rinds, except in a few families by marriage,) say that a man named Hōt (sometimes called Nōt, sometimes Nōtbandag) was their ancestor, was one of the four sons of Jalāl Khān, and was a Rind. That some families in most of the Baloch clans, in nearly all, perhaps, are related by marriage to the Rinds is quite possible as will hereafter become apparent; but I doubt if very free intermarriage between many clans and them, has at any time been prevalent.

Among the earliest mention of Makrān and the Baloch with which I am acquainted are various passages in the Shāh-nāma of Firdūsī (compiled about A. D. 1000 by command of King Maḥmūd of Ghaznī, who is said to have ordered all available resources to be placed at the disposal of the author) in which it is stated that Kai Khusrū (about B. C. 550) King of Persia passed through Makrān and killed the king of the country, also that Naushīrwān (about A. D. 550) inflicted punishment on the Baloch. Bilāthurī who is said to have died in A. H. 279, mentions that a tribe called the "Qufṣ" aided the people of Kirmān against the Arab marauders.

Tabarā who wrote in A. H. 308, also relates that the people of Kirmān asked aid of a people called by the Arabs قفص *Qufṣ* and by the Persians كوج *Kūj* or *Kēj* (of which there is also a reading كفج *Kufj*.)

Ibn Haukal who appears to have written in A. H. 360, and of whose work there are, it is said, only two copies in Europe, writes "to the

“ East of Kirmān lies Makrān and the deserts of that country and Bahrain, on the borders of the Balūj. The mountains of قفص *Qufṣ* lie on the southern border (of Kirmān) near the sea. On the East is خواس *Khawās* and the desert extending towards قفص *Qufṣ*, and on the South is Balūj. The بلوج *Balūj* (this appears to be a quotation) are in the desert of mount قفص *Qufṣ* in the Persian language كوج *Kūj* or *Kōj*, and they call the two peoples كوج *Kūj* or *Kōj* and بلوج *Balūj* or *Balōj*.

In the *Tarīkh i Guzīda*,” A. H. 730, it is recorded that in the year A. H. 22, ‘Abdu-l-lāh bin ‘Amar bin Rabī invaded Kirmān and took possession of its capital, Kuwāshīr, so that the inhabitants solicited assistance of the men of “Kūj and Balūj” in vain. He then after conquering Sīstān overran Makrān and defeated the king of Sindah, who came to assist in opposing him.

In the *Rauzatu-ṣ-ṣafā* the mountains of the “Kōc wa Balōc” are also mentioned; also very particularly by Abū-l-fidā who gives the exact pronunciation of each name. These historians, or rather some of them, it is proper to mention, say that the قفص وبلوص *Qufṣ* and *Balūṣ* or كوج وبلوج *Kūj* and *Balūj* claim to be of Arab descent, but it must be remembered that they all wrote several centuries after the commencement of the Muḥammadan era, and that the claim so recorded by them, may be fairly considered as a traditional one put forward in their day as now, by, we will say, a majority of the inhabitants.

It, however, appears from the few authorities quoted that the Baloch were established in Makrān more than a century before the commencement of the Muḥammadan era; certainly so if, as Firdūsī relates, Nau-shīrwān punished them in Makrān, and still more certainly that they were located there within 22 years after its commencement; and that therefore if the Rinds left Aleppo in the time of Yazīd I, say (A. H. 61), according to their tradition the Baloch were in Makrān before that date.

It appears to me doubtful that the Rinds ever came from Aleppo, or that they are Baloch at all. Had they come from Aleppo, some history of their journey thence, through Persia—some one incident, out of many which must have occurred to them on such a journey—the name of some one place, at least, at which they halted on that journey—would surely have been handed down to posterity. Who then are these Rinds from “Alaf”? Whence this tradition of theirs? And why has a connection with them been at any time considered honorific by the inhabitants of Makrān?

I reply—that, as early as A. H. 15 at any rate, expeditions were inaugurated, and indeed despatched by the Arabs of ‘Umān (‘Omān) against the frontiers of India, and it is recorded by Tabarī, that Al

Hajjāj, the then governor of Irāk, about A. H. 65, appointed Sa'id bin Aslam bin Zurā al Kalabī to Makrān and its frontiers, and that he was killed by Mua'wiyah and Muḥammad, the sons of Al Hāriṣ al 'Alāfī, viz., Al Hāriṣ of the 'Alāfī tribe. The pedigree of the founder of the tribe is then given as follows:—

اسم علف هو ريان بن حلوان بن عمران بن الحاف بن قضاعة

that is to say they were the descendants of a man called 'Alāf who was a descendant in a direct line from a well-known personage named Quzā'a of Kahtanic stock. Sa'id bin Aslam was opposed by these two brothers (sons of Al Hāriṣ of the 'Alāfī tribe) because he had killed a relation and fellow-countryman of theirs. They had come from 'Umān ('Omān) and after killing Sa'id they took possession of Makrān.

Subsequently Al Hajjāj appears to have sent a strong force against them, before which, although they are said to have been the victors, they retired, about A. H. 86, into Sindh, where their name is conspicuous in the annals of that country for the next two hundred years or so.

These and many other recorded facts regarding these 'Alāfī and their doings, tally so well with the traditions regarding the earliest movements, in Makrān, of the Rinds and some few clans, which really were, or had become, more or less closely connected with them (some of whom I believe to have been also Arabs and some others probably foreign to Makrān), give me grounds for expressing a belief that the Rinds are, as they assert, of Arab descent, not indeed a people who emigrated from the town of Alaf = Haleb = Aleppo in Syria, but a people descended from a man named 'Alāf i.e., a tribe called the 'Alāfī, of 'Umān ('Omān.) Not Quraish, who are Ishmaelites, but 'Alāfī, who are Kahtanites. The Baloch, and the Arabs for that matter, are fond of philological discussions as to the origin and meanings of names, and, given a name, they will certainly find a history and meaning for it; and being some of them Alafī, viz., 'Alafī, or descended from them, their derivation of the name is probably founded on no better authority than their own fancy or that of their ballad makers. The ballad was composed, I believe, within the last 200 years, or less, and the migration from Haleb = Alaf was not improbably suggested by some of the many Makrānīs who have taken service in Mesopotamia and to whom the name of Haleb = Alaf = Aleppo was familiar, and it was a very likely one for them to hit upon.

As regards the status of the Rinds, it will be readily understood, that as the whole of the tribes of Balochistan have adopted the Muḥammadan religion, they are not unwilling to be believed to be related to a people of undoubted Arab descent; who were certainly amongst the

first propagandists of their present faith in the country, *viz.*, the Kahtanite 'Alāfi of 'Umān, who now very naturally claim to have belonged to the Quraish, the most honourable tribe amongst Muḥammadans. In Elliot's History of India will be found the genealogy of the Jats and Baloch (linked together) from Muḥammad, son of Hārūn Mukrānī (Mukrīsnū), a grandson of Muḥammad, son of Abān, son of 'Abdu-r-raḥmān, son of Hamza, son of 'Abdu-l-mattab. But as Hamza had no sons by any daughter of man, 'Abdu-r-raḥmān's mother is conveniently stated to have been a fairy (*this is their Quraish descent*). Muḥammad son of Hārūn is said to have had 50 sons, by 7 wives, the name of *three* of which sons is Jalāl (and Makrān is said to have been divided between the sons of one of these three Jalāls after the death of Al Hajjāj), the sons of his 6th and 7th wives are said to have borne the following names—VI, Fatimah, bore 1 Shēr, 2 Kōh, 3 Buland, 4 Gurg, 5 Nūru-d-dīn, 6 Ḥasan, 7 Ḥusain, 8 Sulaimān, 9 Ibrāhīm; VII, Eve, bore 1 'Ālam, 2 'Alī, 3 Sarkash, 4 Bahādur, 5 Tēghzan, 6 Mubārak, 7 Turk, 8 Zalha, 9 'Arābī, 10 Shirāz, 11 Tāju-d-dīn, 12 Gulistān Barg. Comment on these names appears unnecessary, but I have no doubt that a certain Jalāl Khān is a historical personage.

Cākar Khān, a descendant of Jalāl Khān and one of the most renowned chiefs of the Rinds, is positively stated, in the traditions and ballads of the country, to have taken Delhi after leaving Makrān (a statement I will now pass by.) The following is a traditional list of the Rind tribe, which Cākar Khān is said to have left behind him in Makrān, starting on the expedition which then led to that event.

The Rēkī (went to Dehgwārān), the *Jat*, *Lattī* (said to be the same as the *Kalmatī*) *Nōhānī*, *Kurd*, Gabōd (or Gabōl), *Mahīrī*, *Askānī*, *Gādon*, *Marastānī* (stayed in Kolwāh), the *Pūzh* (in Kōlāñc) the *Lāshārī* (in Lashār) the *Barr*, *Cānda*, *Marri*, *Lāngā*, *Zahrī*, *Sasūdi*, *Kalkalī*, *Damūnī*, *Birdī*, (same as Gōjah) *Gōrgēj*, *Lōhānī*, *Siāhpād*, *Kōs-ag*, *Lagōr*, *Balī*, *Lātik*, *Bāmanī*, *Rēganī*, *Dodāi*, *Sābikī*, *Pandaran*. These formed part of his following, and having elected to remain behind, afterwards dispersed into different parts of the country. The names in italics, it is sufficiently evident, are not those of Arabs.

The Gōrgēj were probably Georgians. The Kōs-ag and Marri, judging by their names, were probably Arabs (in the time of the Khalifa Hashām, A. H. 105–125, Junaid son of 'Abdu-r-raḥmān al Marri was appointed to the Indian frontier). The Gabōl I believe to be an aboriginal and Cushite tribe, "straight-haired Ethiopians." The Hōt or Ōt have been previously mentioned and identified with the Utii of Herodotus and other authors, who were also, I think, not impossibly the same with the Jats and Zothali and Yucchi (both Jats and Meds are still plentiful in the country).

The Kalmatī are the principal inhabitants of Kalmat and Pasni.

The Lattī are said to be Kalmatī under another name.

The Bulaidī may possibly be descendants of an Arab named Budail, two letters of his name having been transposed in a very common manner; *e. g.*, “aps” for “asp” (horse) “ushtur” for “shutur” (camel) “nīrmōc” for nīmrōc” (half mid-day,) &c., &c. Perhaps such transposition of letters in the present case may be the result of “a proverbial” alliteration of the name of their chief town now called Bulaida, but which may have been first called Budaila *i.e.*, town of Budail, thus “Budaila bulaida,” *viz.*, Budaila is “a little town” (*bulaida* being the diminutive of *balda* “a town”); compare later on “*Balōc badrōc*” or “*Balōc Gadrōc.*” Budail of the Bajalī tribe, sent from ‘Almān by Al Hajjāj, A. H. 86-96 against Sināh and killed there by the enemy, may have been the founder of “Budaila bulaida,” but Budail is a common Arab name.

As before stated Arab historians mention a people called قفص *Qufṣ* or كفج *Kufij* inhabiting mountains to the south of Kirmān, called the mountains of قوص *Qufṣ*, somewhat to the south-east of which the low-lying country was inhabited by a people called the Balūṣ or Balūj = the Baloch. Some of the later historians have given كوج *Kūj* or Kōj as the Persian rendering of قفص *Qufṣ*. As, however, I met, at Sadech, a tribe who believed themselves to be aborigines, of whom there are many in Bashkard to the south of Kirmān, whose principal habitat is the mountain range of Gōkō in Bashkard, about 30 miles from the seacoast (the highest range in Balochistān, *viz.*, 7,000 feet) and who call themselves *Kufish* كفش, or *Kufic* كفج, *Kufij* كفج, or *Qufṣ* قفص I think that the قفص *Qufṣ* of Bilāthuri, Tabarī (who also gives كفج *Kufij*), and Ibn Haukal are the correct readings. It is easily seen that قفص or كفج if badly written in Arabic characters, would very likely be copied as قفص and كوج both of which are given as alternative readings, and by ‘Abu-l-fidā the last explained as the Persian equivalent of the first. I leave it to more competent authority to decide whether Kōfish, Kōfic, Kufij, Kūs, Kūj or Kōj, Kūi, Kēc, Kōc, Kīj, Kēj, Kiz, Kish, Cash and Cush, the son of Ham, are simply variations of the same name or not. I would now suggest an identification of the “Paricanii” of Herodotus, with a tribe called the “Purki,” the plural of which would be Purkiānii, Paricanii, *i.e.*, perhaps, “Vehrkan” of the Zend and “Varkān” of ancient Persian. They dwell to the north of Kech in the locality assigned to the Paricanii in our maps, and I submit that the identification of them with the Parikanii (Paricanii) is on etymological grounds preferable to that of the Brahui with the Parikanii, though “Varkān” and “Ba-rohi” may both mean “hillmen,” and I take it that (as al-

ready suggested by Professor Rawlinson), while the latter are distinctly Cushite, the former are possibly Turanian or probably Iranian, living side by side. The Purki are few in number, believe themselves aboriginal, and claim no connection with the Rinds.

With regard to the name "Baloch" I would also hazard a suggestion which, if it contains an element of truth, some better philologist than myself may perhaps uphold. It is this—whenever I have enquired of the "Baloch" the *meaning* of their name, they have *invariably* replied (as if the expression were proverbial) "*Balōc Badrōc*" (*Badrōsh* in some parts of the country). *Bad* means "evil," "bad" "ill," and *rōc* or *rōsh* means "day" (*rūz* is the modern Persian pronunciation). *Gad* in Pehlevī or Zend (ancient Persian) is equal to and synonymous with *bad* in Balochi or more modern Persian, therefore *Badrōc* or *Badrōsh* or *Bādrōṣ* in Balochi is equivalent to *Gadrōc* or *Gadrōsh* or *Gadrōs* of the more ancient Pehlevī or Zend, and to *Gadros-ii* or *Gedros-ii* of the Greeks. *Badrōc*, from the interchangeability of the liquids "r" and "l", is equivalent to *Badlōc*, out of which the "d" must naturally drop, leaving *Balōc* equivalent to "the *Gedros-ii*." If the derivation of *Balōc* from *Gadrōc* in the manner suggested be considered philologically inadmissible, then we may suppose that the proverbial expression *Balōc badrōsh* was current in the time of the Greeks, only that it was pronounced in those days *Balōc gadrōsh*, and that the Greeks wrote down the epithet for the name, which in such case would undoubtedly have been derived from *Belus* (or *Balochis*.) Note that *Sistān* was called *Nīmrōc* "half day."

The suggestions made in the foregoing paper are, I wish it to be understood, tentative suggestions only, put forward, together with the arguments in support of them, in the hope of stimulating enquiry into the earlier history of Balochistan and of the various clans now and in times past inhabiting it (such page in the world's history being at present almost blank) and not as authoritative conclusions. It is probable that my suggestions that the Rinds, Marrīs, and other clans who now claim to be the "pur sang" of the Baloch, are not Baloch at all, may find many warm dissentients, but it will be necessary at any rate for such dissentients to define whom they call Baloch and give a derivation of the name; to offer a more plausible one than I have ventured on, *viz.*, *Balōc*=*Gadrōs*; to trace back to Aleppo the Rinds and other clans claiming to have migrated thence; and to explain away the statements of Firdusī and other authors that certain Baloch clans, *named by them*, and who still exist in the country under the same names, had their habitat in *Makrān* long before the Muḥammadan era.

On some rare Muhammadan Coins.—By SURGEON-CAPTAIN W. VOST.

(With two Plates.)

[Read April 1895.]

I. SHĒR SHĀH SŪRĪ.

PLATE II. FIG. 1. [W. CROOKE, C.S.]

Weight in
grains and
measurement
in English inches.

Obverse.

In double square—

Æ	شاه سلطان
172	شیر
1.07	خلد الله ملكه

Lower margin—

شیر گده followed by words which do not appear to be either a date, or عرف قنوج. Mint: Shērgarh. *Other margins, doubtful.*

Reverse.

In double square, Kalimah and probably names of companions of Muḥammad.

PLATE II. FIG. 2. [W. CROOKE, C.S.]

Æ	<i>Obverse and Reverse.</i>
165	As on Fig. 1.
0.85	

PLATE II. FIG. 3. [W. CROOKE, C.S.]

Æ	<i>Obverse and Reverse.</i>
172	As on Fig. 1, but no margins.
0.75	

On all three coins 6-rayed star above ر of شیر, and 5-rayed star in upper left hand corner of double square of reverse.

Weight in
grains and
measurement
in English inches.

As the letters, position and style of ornaments on coins Figs. 2 and 3 agree so minutely with those on Fig. 1, I think they must all have been minted at Shērgarh. Mr. Rodgers believes a coin like Fig. 3, in the March Number of the *Indian Antiquary* for 1888, to be a forgery.

PLATE II. FIG. 4.

In square areas with a loop at the corners:—

Obverse.

Æ

سلطان

307

شیرشاه

Mint: Chunār.

0.9

خلد الله ملكه

Upper margin, ابوالمظ; *right* ضرب چنار; *lower*, illegible; *left*, absent.

Reverse.

فيعهد

الميرة

951 H.

الحامى

Upper margin ... العد; *right* سنه ٩٥٢; *lower* and *left* illegible.

Rupees only were known of the Chunār mint.

Unique.

II. ISLĀM SHĀH, SŪRĪ.

PLATE II. FIG. 5. [DR. W. HOEY, C.S.]

Obverse.

Æ

الوائق بتائيد

316

الرحمن الو

0.9

شاه

اثق اسلام سلطان

الله

خلد ملكه و سلطانه

Reverse.

دار الضرب (؟ دارالجرت)

فرعهد الملكة

العاذل اسلام

لودهانه بلدة (؟)

(Date here not seen).

PLATE II. FIG. 6. [W. CROOKE, C.S.]

Æ

Obverse and Reverse.

316

As on Fig. 5, with date ۹۴۰.

0·9

The mint appears to be either Lūdhīāna لودھیانا, as suggested in the *Journal, Asiatic Society*, by Mr. Rodgers, or possibly Būdhāna بودھانا in the Muzaffarnagar district of the North-Western Provinces.

These appear to be the same as those beginning with No. 84, Islām Shāh, in the "Coins of the Mogul Emperors of India," and are of importance in shewing clearly several words of the legends not previously correctly read.

III. MUHAMMAD SHĀH, SŪRĪ.

PLATE II. FIG. 7. [W. CROOKE, C.S.]

Obverse.

Æ

۹۶۰ ۸

960 H.

302

[ش] ا محمد ×

0·83

السلطان (?)

Reverse.

ناصر الدنيا والدين

ابو الفتح

Mint:

[متبر] ک جون [پور]

Jaunpūr.

Compare No. 8, p. 54, "Mogul Emperors of India," Rodgers, 1894.

Unique.

PLATE II. FIG. 8. [W. CROOKE, C.S.]

Obverse.

Æ

بتا [د] بد الرحمن

153

محمد × عا [دل]

0·68

Reverse

ین الد ...

۹۶۳

963 H

[ضرب چ] هوسه

Mint: Chūsa.

In the Indian Museum Catalogue, Part I, 1894, there is a rupee of Muḥammad Shāh Sūr, from the Chhūnsī mint.

Unique.

IV. AKBAR.

PLATE II. FIGS. 9, 10, 11, 12.

Weight in
grains and
measurement
in English inches.

Æ

302 — 0·87

309 — 0·82

312 — 0·85

162½ — 0·73

Obverse.

دار الخلافه

فلوس*

س — كه

بهر ايج

ضرب

*Reverse.*و
هشت د

هفتا

نمصد

سنه

في تاريخ

٩.....٧

Mint:

Bahrāich.

978 H.

The 14 coins of the Bahrāich mint, I have seen, are dated in 976 or 978 H. They are at once recognized by the 6-rayed star in the loop of س of falūs. Many of the reverses of these coins have not the word سنه. I have shewn the numerals in the position I have seen them on some specimens. Bahrāich has not before been recorded as one of Akbar's mints. From a comparison of the four coins now figured the legend can be made out.

PLATE II. FIG. 13.

Obverse.

دار الخلافه

خطه اوده

ضرب

Reverse.

Illegible.

Mint:

Audh.

Æ

316

0·85

The Āin-i-Akbarī tells us "Ayodhya, commonly called Awadh" was one of the mints of Akbar from which copper was issued. The word خطه occurs on coins of Bābar and Humāyūn of the Jaunpur mint, and on some of Akbar struck at Kālpī.

Unique.

PLATE III., FIG. 14. [W. CROOKE, C.S.]

Obverse.

Æ	(?)	غازي	[اكد؟]	
301		بادشاه		966 H.
0·9		٩٦٦		
	(?)	سنه	محمد	
		ن	ملکه وسه	
			Reverse.	

Kalimah in two lines.

At page 222 of the *Indian Antiquary* for July 1890, Mr. Rodgers has given (Fig. 19, Plate ii.) a coin very similar in appearance to this weighing 315 grains and dated 966 H. He reads the obverse inscription:—

جلال الدين محمد اکبر ضرب سنه ٩٦٦

PLATE III., FIG. 15.

Obverse.

Æ	پور	Mint:
309	جلال	Jalālpūr.
0·85	...	

Reverse.

چهار	
هفتاد [و]	974 H.
نمصد و	

Jalālpūr, on the right bank of the Jhelam river in the Panjāb, was a flourishing place in Akbar's time. General Cunningham identified it with the ancient Bucephala. Now it is of no importance.

As this coin was found in Audh, it may have been struck at one of the two towns, named Jalālpūr in that province.

Unique.

PLATE III., FIG. 16. [V. A. SMITH, C.S.]

Obverse.

In oblong area—

AR	۱۰۰۰	1000 H.
Square.	محمد اکبر با [د شاه	
174	جلال الدين	
0·7 × ·75	Margins illegible.	
	Reverse (not shewn).	
	Kalimah.	

Coin peculiar in having figures instead of الف for 1000 H.

PLATE III., FIG. 17.

Weight in
grains and
measurement
in English inches.

Æ

150

0·7

*Obverse.*گورکپور
فلوسMint:
Gōrakhpūr.*Reverse.*٥٠
اله
دي50th year.
Month: Daī.
Unique.

PLATE III., FIG. 18.

Obverse.

Æ

37½

0·4

[پور]
گورکMint:
Gōrakhpūr.*Reverse.*(٥) شتا (د)
نہصد
سنہ

980 H.

Ornament of 4 loops before first گ of mint name.
Unique.

PLATE III., FIG. 19. [V. A. SMITH, C.S.]

Obverse.

In a circle with dotted circle outside:—

Æ

38

0·45

گورکپور
فلوسMint:
Gōrakhpūr.*Reverse.*

Part of a circle visible:—

٥٠
اله
خور داد

50th year.

Month: Khūrdād.

Part of ornament as on Fig. 18. Thomas, in *Chroni-
cles*, page 428, gives گورکھپور as the spelling of this
mint.

Unique.

PLATE III., FIG. 20.

Obverse.

Æ

154

0·7

تَنكِه اِكْبَر شَاهِ

 $\frac{1}{4}$ tankah.

چهارم حصه

۷

(P = 1007 H.)

(P) سنه

Reverse.

[۴] ۴ الھ

44th year.

ابان

Month: Abān.

PLATE III., FIG. 21.

Obverse and Reverse.

Æ

158

0·77

As on Fig. 20, but بهست
اردیMonth:
Ardībhīst.

PLATE III., FIG. 22. (W. CROOKE, C.S.)

Obverse.

Æ

318·5

0·85

(P) دار الخلافه

Mint:

فلوس⁺

Kalānūr.

ضرب کلانور

Reverse.

چ [ها] ر

هشتاد [و]

984 H.

نہصد [و]

سنه

فے

Star of 4 points in س of falūs, and 4-looped ornament attached to tail of د of نہصد.

Unique.

PLATE III., FIG. 23.

Obverse.

A

180

0·75

[خلد] الله تعا ملکہ

محمد اکبر بادشاہ

جلال الدین غازے

[ضرب] ب دار... الہ آباد Mint: Allahābād.

Reverse. (Not shewn).

Kalimah, with (P) ۹۷۸ in right hand lower corner of coin.

987 H.

Unique.

V. JAHĀNGĪR.

PLATE III., FIG. 24.

Weight in
grains and
measurement
in English inches.

Obverse.

In 8-foil, in a circle, with dotted circle outside:—

Æ
136
0.95

شَد
روان

Reverse.

In 8 foil, &c.

۱۰۲۲
قندهار
فلوس

1022 H.
Mint: Qandahār.

A coin of this type given by me to Mr. C. J. Rodgers is now in the Lahore Museum. It is dated 1019 H., 5th year, and weighs 129 grains.

Besides the one in the plate another in my collection, 1027 H., weighs as much as 154 grains. Neither appears to have had any regnal year following ن on the obverse. They are not much worn. No others are known. Obtained at Quetta.

VI. SHĀH JAHĀN.

PLATE III., FIG. 25. [W. CROOKE, C.S.]

Obverse.

Æ
38.5
0.53

شاه جهان
فلوس

Reverse.

نارنول
ب
ضرب

Mint:
Nārñol.

VII. AURANGZĪB.

PLATE III., FIG. 26. [W. CROOKE, C.S.]

Obverse.

Æ
307.5
0.85

سنة
اباد
شاه
جهان
ضرب

Reverse.

سنه
مبارک
جلوس

Mint:
Shāhjahanābād.

Good specimens give the regnal and *Jalūs* years respectively above سنه of the obverse and reverse.

PLATE III., FIG. 27.

Obverse.

A

171

0·85

اورنگ زیب عالم گیر

۱۱۱۵

1115 H.

شاه

زد چو مهر منیر

سکه

[درجہ ان]

Reverse.

جلوس
میمنت
دار الجهاد تته
۴۷
مانو [س]
ضرب

Mint:
Dāru-l-Jihād
Tattah.
47 jalūs.

On obverse ۱۱۱۵ below زیب; reverse ۴۷ below ه.

“Dar-ul-Jihād” we know from rupees of Aurangzib was applied to Haidarābād (Sind). This is the first time it has been observed on a mohur, and it is interesting to discover that Tattah, still lower down the Indus, also used the epithet.

VIII. MUḤAMMAD SHĀH.

PLATE III., FIG. 28.

Obverse.

Æ

190

0·8

محمد

شاه

[با] د شاه غازے

(?) سکه مبارک

Reverse.

سنه

6 jalūs.

۶

Mint:

[جل] و سس

Hāfizābād

ضرب

حافظا باد

Hāfizābād, 32 miles west of Gujrānwālā, Panjāb,

Weight in
grains and
measurement
in English inches.

formerly of great importance, is recorded in the Aīn-i-Akbarī as the head-quarters of a Mahāl. This is a new mint. The coin is of the 6th year, probably of Muḥammad Shāh Mughul.

Unique.

IX. SHĀH 'ALAM.

PLATE III., FIG. 29.

Obverse.

Æ

169

0·9

شاه عالم

ۛ

باد شاه عاز

ۛ

ک

سکه مبار ۱۱۸۴

1184 H.

Star of 8 dots below م of عالم, and ornament of 3 rays above ب of مبارک.

Reverse.

مصطفی اباد

Mint:

ضرب

Muṣṭafābād.

جلوس میمنت مانوس

۱۱

11 jalūs.

Star of central dot and 7 rays in س of جلوس and part of one of three-pointed rays in س of مانوس. 1184, 11th year.

Muṣṭafābād is between Sahāranpūr and Lūdhīāna.

Unique.

PLATE III., FIG. 30.

Obverse.

Æ

192

0·85

عالم شا

۱۲ ۱

1212 H

ۛ

فلوس

Reverse.

اباد

Mint:

حسین

Husainābād.

[ضرب] ب

[جلوس] ۳۹

39 jalūs.

Husainābād is probably that portion of Lākhnau (Lucknow) known by this name.

Unique.

TABLE OF CONTENTS PLATE II.

No.	Name.	Mint.	Epithet.	Year. (H or I)	Month.	Jalūs. Metal.	Weight.	Measure- ment.
1	<u>Shēr Shāh</u> Sūrī	<u>Shērgaḥ</u>	...	.....	.....	Æ	172	1·0
2	” ”	.....	...	.....	.....	”	165	0·85
3	” ”	.....	...	.....	.....	”	172	0·75
4	” ”	Chunār	...	951	.....	Æ	307	0·9
5	Islām ”	(?) Būdhāna	(?) Dāru-ḡ-ḡarb	.....	.....	”	316	0·9
6	” ”	”	”	95 ^x	.....	”	316	0·9
7	Muḥammad ‘Ādil Shāh Sūrī	Jaunpūr	Mutabarak	960	.....	”	302	0·83
8	” ”	Chūsa	...	963	.....	”	153	0·68
9	Akbar ...	Bahraich	Dāru-l-khilāfat	978	.....	”	302	0·87
10	” ...	”	...	”	.....	”	309	0·82
11	” ...	”	...	97 ^x	.....	”	312	0·85
12	” ...	”	...	97 ^x	.....	”	162·5	0·73
13	” ...	Audh	<u>Khitta</u>	.....	.....	”	316	0·85

TABLE OF CONTENTS PLATE III.

No.	Name.	Mint.	Epithet.	Year. (H or I)	Month.	Jalus. Metal.	Weight.	Measure- ment.
14	Akbar	.....	...	966	.....	Æ	301	0·9
15	”	Jalāl-pūr...	...	974	.....	”	309	0·85
16	”	.....	...	1000	.....	Æ	174	0·7 × 0·75
17	”	Gōrah-pūr	...	50	Daī	Æ	150	0·7
18	”	”	...	980	.....	”	37·5	0·4
19	”	”	...	50	Khurdād	”	38	0·45
20	”	.....	...	44	Abān	”	154	0·7
21	”	.....	...	44	Ardībhīst	”	158	0·77
22	”	Kalānūr ...	Dāru-l-khilāfat	... 984	.....	”	318·5	0·85
23	”	Allahābād	Dāru-l- (?)	987	.....	A	180	0·75
24	Jahāngīr	Qandahār	...	1022	.....	Æ	136	0·95
25	Shāh Jahān	Nārnōl ...	...		.....	”	38·5	0·53
26	Aurangzīb	Shāhjahanābād	...		.....	”	307·5	0·85
27	”	Tattah ...	Dāru-l-jihād	1115	.....	A	171	0·85
28	Muḥammad Shāh	Hāfizābād	...		.....	Æ	190	0·8
29	Shāh ‘Ālam	Muṣṭafābād	...	1184	.....	Æ	169	0·9
30	”	Husainābād	...	1212	.....	Æ	192	0·85

Coins of the Musalmān Kings of Ma'bar.—By CHAS. J. RODGERS, ESQ.,
Honorary Numismatist to the Government of India.

[With two Plates.]

[Read April 1895.]

In the two plates which accompany this paper I have drawn some coins which were sent to me by the Rev. J. E. Tracy of Kodaikanal in the District of Madura, Madras Presidency. The last two coins, however, are from my old collection, now in the Lahore Museum. Each coin's weight is below it; the metal is above it. (M=mixed metal). T=Rev. J. E. Tracy. L. M.=Lahore Museum.

I will at once give the transcriptions of the legends and reserve my remarks on the kings to the end of this paper.

Plate IV (1)	الإمام العادل	محمد بن تغلق شاه
„ (2)	do.	do.
„ (3)	do.	
„ (4)	جلال الدنيا و الدين	احسن شاه ۷۳۷
„ (5)	السلطان الاعظم	احسن شاه السلطان
„ (6)	سلطان السلاطين	احسن شاه
	In circular area :—	
	In margin :—سنة... و ثلثين و سبعمائة	
	(unit word not plain).	
„ (7)	علا الدنيا و الدين	اروحر شاه السلطان
„ (8)	do.	اروحر شاه
	In circular area :—	
	In margin :—سنة اربعين و سبعمائة	
„ (9)	قطب الدنيا و الدين	فيروز شاه ۷۴۰
„ (10)	السلطان الاعظم غياث الدنيا و الدين	محمد دامغان شاه
	In circular area :—	
	In margin :—سنة احدى اربعين و سبعمائة	

Plate IV	(11)	السلطان الا عظم	غياث الدنيا و الدين
„	(12)	In circular area :—	ناصرالدنيا و الدين
		In margin :—	
		سنة خمس (٩) اربعين و سبعمائة ¹	محمود عيال دامغانشاه السلطان
„	(13)	السلطان الا عظم	عادلشاه السلطان
„	(14)	السلطان الحليم (?) ٧٥٧	عادل شاه — In circular area :—
		In margin :—	سنة تسع وخمسين و سبعمائة
„	(15)	السلطان الا عظم	عادلشاه السلطان
„	(16)	do.	do.
„	(17)	do.	do.
„	(18)	برگزیده الله	خادم مصطفى ٧٦٥
Plate V	(19)	do.	٧٦٧ do.
„	(20)	do.	٧٧٠ do.
„	(21)	محمد مصطفى	٧٦٥
„	(22)	برگزیده رحمان	سكندر شاه سلطان ٧٧٩
„	(23)	برگزیده الله فخرشاه	مباركشاه شاه جهان ...
„	(24)	السلطان الا عظم	نصرة الدنيا و الدين
„	(25)	do.	شمس الدنيا و الدين
„	(26)	برگزیده الله فخر شا (٨ شاهان)	مباركشاه شاه جهان
„	(27)	do. full	do.
„	(28)	do.	do.
„	(29)	برگزیده رحمان	سكندر شاه سلطان ٧٧٤
„	(30)	do.	do.
„	(31)	برگزیده الله فخر شاه ..	مباركشاه شاه جهان ٧٦٥
„	(32)	الرواق بنصر الله ٧٣٣	محمد بن تغلق شاه
„	(33)	السلطان الا عظم	جلال الدنيا و الدين
„	(34)	غياث الدنيا و الدين ²	محمد ابن السلطان
„	(35)	علا الدنيا و الدين	سكندر شاه السلطان
„	(36)	ناصر الدنيا و الدين	ابو الفتح اسمعيل شاه

¹ The word خمس is legible on a coin since sent by Mr. Tracy.

² This coin was sent me after my paper had been sent to the Society.

These coins supply us with matter for a small history of Ma'bar (معبر). They give us names and they give us dates. Coins (1) to (3) are two varieties of a type of Muḥammad bin Tughlaq, not mentioned by Thomas and not found in any bazār of Northern India. They are of Ma'bar fabric, and show that that Sultān held sway in the South of India. Coin No. (32) is one mentioned by Thomas, but he reads the obverse الروائق بعصر الله and his coin is dated 730 H. This type is not in the British Museum, neither is it in the Indian Museum, Calcutta. There is one in the Lahore Museum, Rodgers' collection (Muḥammad bin Tughlaq's No. 30). But this has no date, and the obverse legend is in a double circle and the reverse in a single one. We may regard this coin (32), therefore, as a Ma'bar coin of Muḥammad bin Tughlaq, struck in 733 H.

Coin (4) is one of Jalālu-d-dunyā-wa-ud-dīn Aḥsan Shāh struck in 737 H. So is coin (5). Coin (6) is a third variety of the same Sultān. Here he calls himself the 'Sultān of Sultāns.' The date is given in Arabic words in the margin, but the unit word is not plain. The ثلثين 'thirty,' is plain. Coin (40) is a fourth type of this king's coins.

In Elliot's History of India, Vol. III., p. 618, we find the following, taken from the French translation of Ibn i Batūtah. 'The Sultān had appointed the *Sharīf* Jalālu-d-dīn Aḥsan Shāh to be governor of the country of Ma'bar which is at the distance of six months' journey from Dehli.¹ This Jalālu-d-dīn rebelled, usurped the ruling power, killed the lieutenants and agents of the sovereign, and struck in his own name gold and silver money. On one side of the coins² there was impressed the following (letters): *to'e* and *he*, *ye* and *sīn* (these letters, which form the titles of the 20th and 26th chapters of the Qu'rān are among the epithets bestowed upon Muḥammad), and (the words) "father of *faqīrs* and of the indigent, the glory of the world and of religion." On the other face the following: "He who puts his trust in the help of the all merciful, Aḥsan Shāh, Sultān." The Sultān, when he was informed of this revolt, set forth to suppress it.'

We know that Muḥammad bin Tughlaq never got any further than Talingāna. His army was there attacked by cholera, and he returned to Daulatābād. Firishṭa gives us the year 742 H. as the date of this expedition and calls the rebel ruler 'Sayyid Ḥasan.' Now Captain Tufnell says the dates 738 and 740 appear on the silver coins of Jalālu-d-dīn. And Ibn-i-Batūtah says that when Jalālu-d-dīn died, 'he appointed as his successor, Alaioddin, one of his Amīrs. After this,

¹ Further on he says Ma'bar is three months' march from the capital of Tilang.

² No coins have yet been found bearing these legends. They were probably the large silver and gold coins, which the Ṣarrāfs melted down.

his brother's son Kotboddin came to the supreme rule.'¹ The coins we have give us the name of 'Alāu-d-dīn, Arōḥar Shāh or Adūjī Shāh, and his date in the margin of (8) as 740 H. Coin (9) gives us the dates of Quṭbu-d-dīn as 740 (the ۴ is reversed on the coin) and his successor was ¹Ghiyāṣu-d-dīn Dāmghānī, an Amīr of Jalālu-d-dīn to whose daughter he was married; and on coin (10) we find in the margin the date 741 H. in Arabic words. Now all this is plain sailing. Jalālu-d-dīn died in 740 H. 'Alāu-d-dīn could have reigned but a few months of the same year. Quṭbu-d-dīn reigned only 40 days and was murdered by his subjects.¹ His coin is dated 740 H. Dāmghānī succeeded him in the same year. Coins (10), (11) and (34) are of this king.

Coin (12) is one of Nāṣiru-d-dīn Maḥmūd,¹ nephew of Dāmghānī. I read his date in the margin as 745 H., but have doubts about the unit word. Ibn i Batūtah left Ma'bar in this Sultān's reign. Coins (13) (14) (15) (16) and (17) are of 'Ādil Shāh. He calls himself the "meek" (حليم) Sultān on (14). On this coin is a date in the margin 759 H. Three marks on the obverse may be ۷۵۷, but they are probably diacritical marks.

Coins (18) to (21) have no king's name on them, but they have dates 765, 767, 770. برگزیده الله or 'The Elect of God' and خادم مصطفی 'the slave of the Chosen-one' are the names or titles on these coins. Now (31) is of the date 765 H., and gives the name of the king as Mubārak Shāh, King of the World (مبارکشاه شاه جهان), and his title on the other side is برگزیده الله with an addition فخرشاه شاهان or 'the Glory of the King of kings.' Coins (23) (26) (27) (28) help us in this assignment of all these to one king — Mubārak Shāh.

There are three other dated coins (29) and (30) of برگزیده رحمان or 'The elect of the Merciful,' Sikandar Shāh. One is dated 774 H.: (22) is of the same type, but is dated 779 H. (35) is another type of this king's coins.

We have still left two coins (24) and (25) of Naṣratu-d-dīn and Shamsu-d-dīn respectively.² These coins are of persons of whom we know absolutely nothing. There are no other types of them to help us with dates.

Coin (36) is still left to be considered. Its legends are plain ناصرالدینا والدين ابو الفتح اسمعيل شاه. Amongst the nobles who rebelled

¹ Dr. Lee's Ibn i Batūtah, Chap. XX.

² Firishṭa has, و شهاب سلطان را نصرت خان خطاب داده ولایت بیدر حواله او نمود. This may be the man who struck (24). It is within the bounds of possibility that (24) and (36) were struck by one and the same king.

against Muḥammad bin Tughlaq was one who is styled by Firishta 'Ism'ail Fath brother of Gul Affghān' and it is added:—

بپادشاهی برداشته نصیرالدین خطاب کردند -
 * بیت * سمعیل فتح را دران دارد گیر
 بشاهی بخواندند شاه نصیر—

All throughout Firishta calls him 'Ism'ail Fath.' He did not enjoy being king in such troublous times and he resigned. Ḥasan Gāngō was elected in his place. This was in 748. So this coin (36) must have been struck about 747 or 48H. It does not really, therefore, belong to the kings of Ma'bar.

It will be noticed that the first king of Ma'bar was Jalālu-d-dīn Aḥsan Shāh. His reign was from 737 to 740H., according to coins. Now Ḥasan Gāngō became independent in 848H. He made Gulburga his capital and called it Ḥasanābād. So says Firishta, who quotes a lot of poetry in which Ḥasan and Ḥasanābād frequently occur. But as on the coins of the dynasty of Ḥasan, Gulburga is always called احسن اباد Aḥsanābād, the full name of this sovereign was 'Alāu-d-dunyā-wa-ud-dīn Aḥsan Shāh Gāngō Bahmanī.' We must not suppose that Jalālu-d-dīn had anything to do with Aḥsanābād. He was only king in Ma'bar, which is a long way from Gulburga. Ma'bar seems to have been that part of India opposite Ceylon, and Madura was its capital. When Ḥasan Gāngō reigned in Aḥsanābād, he never seems to have taken any notice whatever of Ma'bar and its affairs. All the descendants of Ḥasan are well known. They also abstained from meddling in Ma'bar matters.

One thing at first seems strange. The coins of the kings of Ma'bar are found apparently in abundance. The coins of early kings of the Bahmanī dynasty of Gulburga-Aḥsanābād are amongst the rare things in our Museum cabinets. The reason is given by Firishta. The Bahmanī kings quarrelled with the Ṣarrāfs and murdered a lot of them. Coins of Hindū kings were melted down, and only Muhammadan coins were allowed. When the Ṣarrāfs, however, got a chance they melted down Muhammadan coins and made current Hindū ones. In this general melting down Muhammadan Dekkan coins disappeared. The Honorable Mr. Gibbs rescued a few of them, but nowadays an early Bahmanī gold or silver coin is rarely met with.

For nearly all the coins in these two plates I am indebted to the courtesy of the Rev. J. E. Tracy, who kindly permitted me to draw them. For coins (35) and (36) I am indebted to the Lahore Museum. When I made out my Catalogue, I put down coin (36) as an unassigned

coin. I met with the name of Ism'aīl Fath in reading the story of Hasan Gāngō.

We may now sum up what these coins teach us. They simply record the fact (1) that Muḥammad bin Tughlaq held possession of Ma'bar, and (2) that the following kings reigned there:—

Jalālu-d-dīn Aḥsan Shāh	...	737—740 H.
'Alāu-d-dīn Aroḥar or Adūjī Shāh		740 H.
Qutbu-d-dīn Fīrūz Shāh	...	740 H.
Ghiyāṣu-d-dīn Muḥammad Dām-ghān Shāh	... ..	740 H to—
Nāṣiru-d-dīn Muḥammād Shāh	...	745 H.
'Ādil Shāh, the Meek	...	759 H.
Mubārak Shāh, King of the World		
&c.	... ..	765—770 H.
'Alāu-d-dīn Sikandar Shāh	...	774—779 H.
Naṣratu-d-dīn	... ..	(in Beder?)
Shamsu-d-dīn	... ..
Nāṣiru-d-dīn Ism'aīl Fath	...	747-8 H. (in Gulburga.)

Captain Tufnell in "Hints to Coin Collectors in Southern India" was the first to bring these coins to notice. I think that if he had had better coins he would have avoided some mistakes in the coins of the latter kings. He did not read one margin: we have seen that they afford considerable help as they yield dates. He took برگزیده for بن کریده and رحمان for the name of a king. Muḥammad Muṣṭafā and Khādim i Muṣṭafā were also made into kings. We know them only as names or titles assumed by the very pious but somewhat vainglorious Mubārak Shāh. Fakhr and Shāh Jahān were made into kings also, by Captain Tufnell. Two coins not in our plates were given by him; one has عادل on one side with an illegible margin; on the reverse is شاه in a circle. Another has in large letters on one side عادلشاه; the other side is not given. A third coin seems to read فخرالدنيا والدين and السلطان الاعظم. If this be correct we must admit Fakhru-d-dīn into the list of kings of Ma'bar.

I may add that it was from Captain Tufnell and from Messrs T. M. Ranga Chari, B. A., and T. Desika Chari, B. A., that I first of all became acquainted with these coins. The coins in my Lahore Collection, from South India, came from these three gentlemen.

The present paper owes its existence solely to the courtesy of the Rev. J. E. Tracy, M.A.

Buddhism in Bengal since the Muḥammadan Conquest.—By
HARA PRASĀDA ÇĀSTRĪ, M. A.

[Read January 1895.]

Whatever might have been the fate of Buddhism in other parts of India, in the Provinces of Eastern India, it had to suffer serious persecution, nay, it may be said, that Buddhism was expelled from Eastern India by fire and sword. In making excavations at Kuçīnagara ashes were discovered after a certain depth, plainly indicating that fire was one of the agencies employed in the expulsion of Buddhism.¹ At Sārṇāth in Benares, the excavations laid open cook-rooms containing half-boiled rice rotting there for centuries.² The catastrophe was so sudden that the poor Bhikṣus could not even complete their meals. Sir A. Cunningham quotes two passages, one from Tibetan and another from Muḥammadan sources, to shew that at the last Buddhist capital of Bihār, Bakhtiyār Khiljī put a large number of shaven Brāhmaṇs; *i. e.*, Buddhist Bhikṣus assembled at a monastery, to the sword.³

All these facts plainly shew that fire and sword were employed in the destruction of Buddhism in Eastern India. But who employed them? In the case of Ōdantapurī, the last capital of Bihār, it was certainly the Muḥammadans, and presumably in other cases also, they were the destroyers. The Hindū mode of persecuting Buddhists, was quite different. It was persecution and annoyance, and not destruction, Çaçāṅka cut down the Bō tree.⁴ Udayana held a disputation with the life of his Buddhist antagonist at stake.⁵ Gaṅgēçōpādhyāya wrote his great work on Logic with the express object of प्रचण्डपाषण्डतमस्त्रितीर्थया *i.e.*, for dispelling the darkness created by powerful heretics; and Udayana wrote a work entitled *Bauddha-dhikkāra*, or, 'Fie on the Buddhists!' Another Hindū revivalist prohibited the sounding of

¹ Rep. Arch. Sur., Ind., Vol. XVIII, pp. 62-63.

² The same, Vol. I, pp. from 126 to 130.

³ The same, Vol. XI, p. 185.

⁴ The same, Vol. III, pp. 80-81.

⁵ Gaṛē Brāhmaṇ, p. 102-105.

the bell at Buddhist Vihāras, till he was worsted in disputation.¹ This is the Hindū way of persecution. The Sēna rājās of Bengal used to grant lands to Brāhmaṇs bordering on Buddhist Vihāras, thus setting up a perpetual source of annoyance to the inmates of the monastery.² Ridicule was one of the powerful weapons used by the Hindūs in annoying the Buddhists, who were held up in dramas like the Prabōdha Candrōdaya, as great libertines, fond of wine and women. In later Tantras too, Buddha and his followers are regarded as men of pleasure. Their method of obtaining spiritual success, was by means of wine and women. In the Cīnācāra-tantra Tantra, Vaçiṣṭhā is sent to China for obtaining success by means of the Tārā-mantra from Buddha, who lived surrounded by women in China. This is annoyance and teasing, but not destruction.

Assuming, therefore, that the Muḥammadan conquest dealt a death blow to the expiring efforts of Buddhism in Eastern India, it may be asked, was the destruction of Buddhism caused by Muḥammadan conquest complete? People think it to be so, but this is physically impossible. The Muḥammadan conquest itself was not a complete conquest, the Pāṭhāns held the country simply in military occupation. They held some of the big cities and left the rest of the country to govern itself the best it could. It was not possible for them to destroy Buddhism all over the country. Then again, it is difficult to say that the conquerors could distinguish between Hindūism and Buddhism. They were iconoclasts. They destroyed idols, no matter whether they were Hindū or Buddhist. In fact, the pressure of the conquest was felt by both Hindūs and Buddhists alike. The Brāhmaṇs from Rārḥ and Varēndra flocked to Vikramapura,³ the last stronghold of the Sēna rājās, and up to this date there are more Rārḥi Brāhmaṇs at that remote corner of Bengal than in Rārḥa itself, especially the higher class *Kulīns*. To drive away Brāhmaṇs and to destroy a few families is one thing, but quite another thing is the wholesale massacre of Buddhist monks, assembled in central Vihāras during the *Vassō*. If one single monastery is destroyed with all its monks, a whole district, nay, even a larger area, will be without religious leaders and religious teachers altogether. A few cases of massacre like that at Ōḍantapurī, would leave the entire Buddhist population of Bengal and Bihār without leaders. One would be disposed to account for the existence of a vast Muḥammadan population in the Districts of Bengal, amounting to 25 millions

¹ Travels in the Western World, translated from Chinese by Beal, Vol. II.

² Gaṛḥ Brāhmaṇ, p. 281, line XII.

³ See the article Kulīna in the Viçva Keṣa.

of people, by the easy conversion of the Buddhist population after the destruction of their monasteries.

The helpless Buddhists would naturally be inclined more to Muḥammadanism, which has no restriction of food, &c., than to Hindūism, which imposes thousands of restrictions on every action of life.

But was Buddhism actually effaced from the soil of Bengal and Bihār? People think so, but there were traces of Buddhism till very lately. A Kāyastha belonging to Magadha, copied a Buddhist MS. in 1446, The MS. is now at Cambridge.¹ That shews signs of lingering Buddhism. Dr. Hoey has discovered an inscription at Sēt, dated in the thirteenth century, dedicating a temple to the Buddha.² Buddhist monks were at Bōdh Gayā so late as 1331. The Bōdh Gayā temple was repaired by a king of Arakan in 1305. A biographer of Caitanya, named Cuḍāmaṇi Dāsa, makes Buddhists rejoice at the birth of Caitanya. One of the great millionaires of Sātgaṛḥ in Caitanya's time, belonging to the Sōnārbaniā caste, refuses to accept Vaiṣṇavism on the ground that he would not like to be saved, when the whole world round him is plunged in misery.³ This is pure Buddhistic sentiment absolutely unknown to the Hindūs. Çūlapāṇi, writing after the Muḥammadan conquest, makes the very sight of a Buddhist an occasion for performing expiatory ceremonies. The word of the text he quotes is *Nagna*, or naked, which he explains as *Bauddhādayaḥ*. How could he explain that word that way if there were no Buddhists in his country?

These facts will lead to one conclusion that traces of Buddhism were to be found so late as Caitanya's time. In speaking of Buddhism I do not take into consideration the fact of the Buddha's being regarded as the ninth incarnation of Viṣṇu, for in that case all Hindus would be in one sense, Buddhists. No trace of Buddhism has been found after Caitanya's time.

It seems, however, surprising that a religion which existed in Eastern India in such splendour from 600 B.C. to 1200 A.D., should be so utterly destroyed that no vestige of its existence could be found anywhere in Bengal at this day only 700 years after its final overthrow. But fortunately it is not so. A sort of corrupt Buddhism, mixed up with a variety of Aryan and non-Aryan forms of worship, still obtains in Bengal amongst a very large number of lower class people. Of the various castes inhabiting Bengal, Dōms never acknowledge the superiority of Brāhmaṇs. They get all the religious ceremonies of the

¹ See Catalogue of Buddhist Sanskrit MSS. in the University Library, Cambridge, Preface, p. 4 and Book, pp. 69-70.

² See pp. 70-71 of the Sharqī Architecture of Jaunpur, Vol. I.

³ Rep. Arch. Surv., III, pp. 104-105.

caste, performed by paṇḍits of the Ḍōm tribe, and these Ḍōms are the constituted Purōhitas of Dharma, a deity whom I venture to identify with Buddha-dēva. One of the names of Buddha is Dharma-rāja, and this is precisely the name by which the deity Dharma is spoken of by his worshippers. The ancient Bengali literature consists of works describing the way in which different deities manifested themselves in this world and the way their worship became prevalent. I have elsewhere given an account of the prevalence of the worship of Manasā, or Goddess of serpents. There are works also describing how the deity Dharma-rāja manifested himself, and how his worship became prevalent.

According to Ghana-rāma who wrote in 1710 his magnificent work the *Črī-dharma-maṅgala*, on this subject, his work is based on two previous works, one by Rūpa-rāma and another by Mayūra-bhaṭṭa. All these again are said to be based on the Hākanda-purāṇa. My enquiries have led to the fact that works of Rūpa-rāma and Mayūra-bhaṭṭa are still extant, but I have not yet succeeded in getting copies of these works.

The story as given by Ghana-rāma, is this. The son of the great king of Gaṇḍa, Dharma-pāla, had appointed his brother-in-law Mahā-mada, as his minister. Mahā-mada had another sister named Rañjā, for whom he had a dislike, but she was a special favourite of Dharma-rāja. Mahā-mada tries in various ways to destroy his sister's son, Lāu-sēn, but Dharma always protects him. Lāu-sēn is persecuted in various ways, but all these persecutions fail. Lāu-sēn is then sent to lead arduous expeditions against distant countries, such as Kāma-rūpa and Orissa. In all of these Dharma makes him successful. Mahā-mada at last comes to his senses and takes his nephew into favour. Kālu Ḍōm, Lāu-sēn's favorite general, becomes the constituted Purōhita of Dharma and obtains the privilege of being allowed to drink wine and eat hog's flesh. Dharma is described as superior to Brahmā, Viṣṇu, and Mahēçvara, and as having Hanumat as his great general. Ghana-rāma's work is a lengthy one, it repays perusal both as a work of poetic art and as embodying curious informaton about ancient Bengal.

Dharma-pāla The great Buddhist monarch Dharma-pāla, is very well known. He was the first great monarch of the Pāla Dynasty, who were Buddhists. It is also known that he conquered Gaṇḍa and led expeditions to Kāma-rūpa, where also a branch of this dynasty ruled for a long time. It is probable that Buddhism mixed up with some aboriginal form of worship, gave rise to a new form of worship, namely, that of Dharma during the ascendancy of the Pāla Dynasty in Bengal, and that it being suited to the genius of the people, obtained a currency which

still lasts. That Buddhism has a wonderful aptitude in assimilating various forms of Demon and other worships, is well known from the history of Buddhism in Nēpāl and Tibet. The Dharma worship appears to be a similar assimilation of some old-world superstition with Buddhism.

My recent investigations into the mode of Dharma worship, during the Durgā pūjā holidays in the Sub-division of Cutwa, has added another link to the arguments for proving the identification of Dharma-rāja with the Buddha. There is a Dharma temple at Čuōngāchi near Pātuli, the priest of which belongs to the Mayarā caste. He was questioned about the method of worship, and his answers led to important results. He said cooked food is never offered to Dharma; this is precisely the case with Buddhist and Jaina idols. They are regarded as emancipated men and not deities. Any cooked food when eaten by men becomes impure, and so no cooked food is offered to them. Any caste may worship Dharma. The Dōms do worship him and often offer hog's flesh to him, but the Mantra by which Dharma is meditated upon, is very curious. It leaves no doubt that he is the Buddha.

यस्यान्तो नादिमध्यो नच करचरणं नास्ति कायनिदानम्

नाकारं नादिरूपं नास्ति जन्मम यस्य (ह्य जस्य ?) ।

योगीन्द्रो ज्ञानगम्यो सकलजनहितं सर्वलोकैकनाथम्

तत्त्वं तं च निरञ्जनं मरवरद पातु वः शून्यमूर्तिः ॥

He who has no end, no beginning and no middle; he who has neither hands nor legs, he who has no germ of body; he who has no form, no primordial form; he who has no birth; that Yōgīndra, approachable by knowledge, friendly to all men, one protector of all creatures, the truth, the spotless, the giver of boons to mortal men; whose form is Čūnya or void; may he protect you !

The word Yōgīndra applies to the Buddha, as he is called Munindra in the Amarakōṣa. He is approachable by knowledge, while Hindū deities are approachable by devotion.

Most of these adjectives may, though by some stretch of imagination, apply to Čiva or Viṣṇu. But there is one which can never be applied to a Hindū deity and which is a peculiar attribute of the Buddha. This is Čūnya-mūrti, identifying him with void; this is what the Prajña Pāramitā teaches, and is what constitutes the peculiarity of Buddhist teaching that everything resolves itself into *čūnya* or void. The Sanskrit of the Mantra as obtained from the Mayarā priest, is perfectly ungrammatical, and so I tried to get another version of it from a different part of the country, and if possible from a higher

class man. This I succeeded in getting from a small village near the Rajbāndh station in Bankurā.

Though this version is nearer to grammatical Sanskrit, yet it contains one serious grammatical blunder, and though the form in which it is put, looks like the Dhyāna or Mantra for meditating on a Hindū deity by saying चिन्तयेत् शून्यमूर्त्तिं, I fail to understand how the mind can be fixed on a void without beginning and without end, without legs, without arms, without head, and so on. This is in fact an attempt to give to a high Buddhist spiritual conception, a Hindū personified form, and the attempt is a miserable failure. The Mantra too, appears to have been written by an ignorant man in some form of ancient Prākṛit, which many have tried to put in a sanskritised form.

Many would not like to believe that this low worship, accompanied with the sacrifice of pigs, and with Dhyāna and other Hindū forms of worship, can have anything to do with Buddhism, whose first vow was to refrain from killing animals, and which in its earliest forms at least, did away with worship altogether. But that it is so, will appear from translations from the history of Buddhism, by Lama Tāranātha of Tibet, kindly made for me by Babu Çarat Chandra Dās, C. I. E. and appended to this article.

I beg to draw attention to one passage of this translation. 'He (the Dōmācārya) preached the Tāntrik doctrine of Buddhism, called Dharma, to the people of Tippera, and obtained numerous followers. Many among them became *Siddhas* too. He was then invited to the country of Rāḍha, called Rārā in the common language of the people. The Rājā of that country was a bigoted follower of Brāhmaṇs, but seeing the supernatural powers of Dōmācārya, and his goodness and learning, he became changed in his views, and henceforth the "Dharma" Buddhism, in its Tāntrik phase became greatly honored and followed by the people of Bengal, Rāḍha and Tippāra. By the worship of Dharma, is meant, that of the Buddhist deities, such as Vajra-yōginī; Vajra-vārāhī; Vajra-bhairava (Kṣētra-pāla); Vajra-ḍākinī; the Nātha, and so on. In fact, in the latter days of Buddhism, the Dik-pālas, Dharma-pālas and other spirit protectors of Buddhism, became the object of worship to the exclusion of the Buddhas and Bōdhisattvas.'

That Vajra-yōginī, Vajra-bhairavas, and other Buddhist Tāntrik deities used to be worshipped in Bengal, there is no doubt. Many of them are still worshipped in a Hindūized form. But Kṣētra-pāla is still worshipped under his proper name in a non-brahmanic form by low-caste priests. Kṣētra-pāla is represented by some tree. The earth on which it grows has the miraculous power of removing barrenness, and producing male children in one who gives birth to daughters only.

There is a Kṣētrapāla tree at Khaḍ-daha, eight miles from Calcutta, and another at Čingī, in Burdwan.

From very ancient times Buddhist monks used to dispense medicines; that was one of the sources of their influence, nay, of their income. The Dharma priests to this day do dispense medicine. They generally pretend to have received certain specifics for certain diseases from their deity, and if the patient with a devout mind, uses the medicine and pays the votive offering after cure, he is sure to get rid of the disease. The Čuōngāchi Dharma has a specific for diarrhœa. The Jāmālpur Dharma cures not only diseases but grants whatever is desired of him. The Acalēçvara Dharma has a specific for bilious eruptions, and so on.

APPENDIX.

Extract from pages 11 to 14 of “Bkah labs bdun.”—By LAMA TĀRĀNĀTHA of Tibet.

(TRANSLATED BY Č'RĪ ČARAT CHANDRA DAS, C. I. E.)

Tāntrik Buddhism called Dharma (or Chhoṣ in Tibetan.)

During the reign of King Rāma-pāla, the Buddhist Tāntrik Sage, Virūpa, after visiting Sōmanātha in Saurāṣṭra, came to Magadha, and there worked in the cause of Dharma (Buddhism) for the good of all living beings. He was greatly venerated by the people. On one occasion when the king was engaged in a war with the Muḥammadan Tājiks,¹ the Tāntrik charms of this sage are said to have done him much service. One of the elephants of Rāma-pāla, named Bhanvadala, drank the water that was sanctified by the touch of the feet of the sage, in consequence of which it returned from the field of battle after killing one hundred² Muḥammadan warriors. From Magadha, Virūpa proceeded towards the East and came to the country of Gauḍa. There one of the Tājik kings gave him much trouble. The king, it is said, saw a Yōgī sitting near his pillow touching his head. Awaking from sleep he caused Virūpa to be brought to his presence.

He caused him to be thrown into the river to be drowned, but in spite of the repeated attempts to kill him in that manner, he came out safely from the depths of water. He was then ordered to be burnt alive. The fire did not touch him, to the astonishment of all. Then sharp and pointed weapons were tried to kill him. These also failed to do him any harm. During the time he was kept in confinement, he is said to have been forced to subsist on poison: though six loads of it were consumed, yet the sage did not suffer the least injury from its effect. Lastly, for six days

¹ The name by which the Persians and Afghans are known to the Tibetans.

² It appears that the king killed 100 Mlēcch Rājavarṇas or Rājputras, having gone to the field of battle mounted on the elephant.

and nights he was kept without food under strict watch: still he was found to be in good health. Finding that notwithstanding these tortures the sage grew brighter and more powerful than before, the king let him go. He was received by the people with the greatest veneration, as one who had attained *siddhi* (supernatural powers and perfections.)

Being reverently asked who he was, he gave his name as Virūpa. In Gauḍa he initiated the fortunate five in some of the secrets of his mystic cult. Many among them gained what is called the ordinary *siddhi*. In Bengal, during his stay of about four months, he remained accessible to the public; afterwards he disappeared, none knew to what place he went. Probably he proceeded to China from Bengal. This *Ācārya* (religious teacher) was called *Çrī Dharma-pāla*. He was not the same as *Sthavira Dharma-pāla*, the *Upādhyāya* of Nālanda.

His disciple was Kāla Virūpa, or Virūpa, the black, born of Brāhmaṇ parents in Oḍiyana, in the West. The Brāhmaṇ Astrologers predicted that he would be guilty of the commission of the most heinous crimes. At the age of seven he, being turned out of his home, that he might not commit the crimes, wandered from place to place for many years.

His mother, too, after the death of her husband, father-in-law and mother-in-law, became homeless and destitute. She wandered from place to place, till, arriving in Orissa, she became a wine-seller.¹ Her son Kāla also happened to arrive at the same place, and during the night came to her house. Not knowing that she was his mother, while under the influence of wine, he committed one of the four great sins that was predicted of him. Then being very thirsty he drank some beer, mistaking it for water, from an earthen mug. His thirst remaining still unquenched he grew furious with rage, and threw the vessel outside. It struck the head of a calf and killed the little creature. Hearing the dying cry of the calf he came out of the house, and with a view to conceal the act he rolled it down towards the lane, and thereby crushed an old Brāhmaṇ that happened to pass by.

In the morning he found that the wine-selling woman was his mother, and that in one night he had committed all the four great crimes² that were predicted of him, and which were the most heinous among the sixteen great sins mentioned in the Vēdas as destroying Brāhmaṇhood.

Reflecting on the gravity of his sins, he became very penitent and fled for his life and in order to perform penance, from Orissa. He made pilgrimages to almost all the sacred places of the Brāhmaṇs and the Buddhists. But being told that his purification was not complete, he proceeded to the country of Kōṅkana to meet the great Buddhist sage of Jalandharī, then residing there. The sage gave him a mystic *Mantra* to propitiate the Tāntrik deity Vajra-yōginī, and told him that thereby he

¹ In Tib. Chaūg-htshoū-ma, a woman that sells wine, generally a prostitute.

² 1. Drinking wine in a prostitute's place. 2. Incest with his mother. 3. Killing a cow (calf). 4. Killing a Brāhmaṇ.

could purify himself of his sins, should he daily repeat it standing in the Kōṅkana river, only keeping his head above the surface of the water. He accordingly did this for a period of six months without perceiving any signs of success. At length, in a fit of rage he cast away the rosary on which he used to count his daily recitations of the *Mantra*.

His Guru advised him to persevere in the work of penance, as it was sure that he would soon obtain his object. For seven days he performed the penance, with perfect concentration of the mind, and in the early morning of the eighth day, the goddess Vajra-yōginī, in the shape of a pretty little girl, appeared before him. She said 'Why have you come to die in this country of Kōṅkana after crossing 800 arms of the sea and 900 rivers?' He reverently replied: '*Ai mātā Vajra-yōginī, Tērē Saranē!*' O, mother Vajra-yōginī, I have to come to take refuge in thee! Hearing this she touched the crown of his head with her hand and said, 'Go thou to the great sage Virūpa who has performed a profound *Samādhi*. He has been spiritually connected by the chain of *Karma* with you for several births. He is now in the Mahārāṭṭha country.' So saying she disappeared. At that time Virūpa, wearing a cap made of a human skull had returned thither after visiting almost all the sacred cemeteries of India and acquiring the *Mahāmudrā siddhi*. He had become a great Tāntrik, having acquired supernatural powers by the practice of the adept secret cult. Kāla became his pupil and under his guidance gained *siddhi* by propitiating the goddess Vajra-varāhī, who is also called Vajra-yōginī.

The chief disciple of Kāla Virūpa¹ was called Dōm Virūpa Hēraka. ^{Dōm} He was in fact a Rāja of Tripurā (Tippera), which is a country in the eastern direction of Bāṅgālā. When Ācārya Kāla Virūpa visited Tripurā, the Rāja became greatly impressed with his teaching. He wished to be initiated in the mystic cult of the Tāntriks. The sage was greatly pleased with his royal pupil and made him an adept in his mystic art. The Rāja for a long time meditated on the subject of his propitiation, having always in view his Guru, and thereby acquired the preliminary stage of *siddhi*. When he perceived that the time of testing his spiritual capabilities had arrived, he heard a prophecy that the female energy (*śakti*) of his spiritual union was in the person of Padmāvatī, a maiden of the Dōm caste. ^{Dōm} Accordingly he took her as his helpmate for gaining perfection in the Tāntrik cult. The ministers, chiefs, and all the subjects of the kingdom repudiated this conduct of the Rājā and ultimately were obliged to cast him out, both from society and royalty. The Rājā with his Dōm mistress left Tripurā and went to a jungle in the neighbouring country to practise the Tāntrik cult in solitude. He became a great adept in the mystic science by keeping in his vows. Afterwards he visited many other places. He became known as Dōm Rāja or Dōm Ācārya. ^{Dōm} The term Dōm signifies one of very low caste. A Dōm lives out-^{Dōm}side the city. He kills fish, birds, and wild animals, and subsists on them.

¹ According to some Tibetan writers this Virūpa was a *Charmakāra* by birth, but they have no authority to support the assertion. v. *Tār.* II 170. 192

He does not sell meat. He sings and dances (prob. professionally). He sells grass and fruits, &c. He carries on more than one low profession. This Ācārya was not himself a Dōm, but his wife being a Dōmnī, he was called *Dom-pa* Dōm (Tib. Dom-pa) which means one having a Dōm wife. This Dōm Ācārya acquired many supernatural powers and did immense service to the people of Bengal and to Tripurā. Less than six years after his initiation into the mysteries of the Tantras, he visited other countries and made pilgrimages.

During his absence from Tripurā a great many calamities befel the people. Famine appeared and epidemics raged in the country. The court astrologer said that the distress and the troubles of the country were due to the banishment of the good Rājā on account of his religious opinions. Accordingly he was invited to revisit his country. The people received him as a *Siddha* (Saint), and bowed down to his feet in veneration and received his benediction. He preached the Tāntrik doctrine of Buddhism called *Dharma* to them, and obtained numerous followers. Many among them became *siddhas* too.

He was then invited to the country of Rāḍha, called Rāra in the common language of the people. The Rājā of that country was a bigoted follower of the Brāhmaṇs, but seeing the supernatural powers of the Dōm Ācārya and his goodness and learning, he became changed in his views. Henceforth the *Dharma* Buddhism in its Tāntrik phase became greatly honoured and followed by the people of Bengal and Rāḍha and Tippera. By the worship of the *Dharma* is meant that of the Buddhist deities such as Vajra-yōginī or -varāhī, Vajra-bhairava (that is the Kṣētra-pāla),¹ Vajra-ḍākinī, the Nātha, in Tibetan called *Gon-po*, &c.

In fact in the latter days of Buddhism the Dik-pāla, Dharma-pāla and other fancied spirit-protectors of Buddhism became the object of worship, to the exclusion of the Buddhas and the Bōdhisattvas.

¹ Kṣētra, i.e., Buddha-kṣētra.

Črī-dharma-maṅgala : A distant echo of the *Lalita-vistara*,—By PAṆḌIT
HARA PRASĀD ČĀSTRĪ, M.A.

[Read February, 1895.]

In a paper read in December last,¹ I attempted to prove that the Dharma-pūjā prevalent in Western Bengal is Buddhism, though unconscious.

In the preceding paper I have tried to trace the history of Buddhism from the Muḥammadan conquest down to the present day, and also to show how widely Buddhism is still prevalent in Bengal, though in a form scarcely to be recognized, except by the initiated.

In the present paper I purpose to draw a comparison between the *Črī-dharma-maṅgala*, the hand-book of the Dharma worshippers,—the work chanted under thousands of *Bāṭa* trees on the sacred birthday² of the Buddha,—and the *Lalita-vistara*, or the hand-book of the Buddha's life, according to the Mahāyāna School.

In the *Lalita-vistara*, the Buddha is represented as preaching to gods and Bōdhisattvas in the Tuṣita-heaven. He was then *Caramabhavika*, i.e., about to receive his last birth. There was a discussion where he should be born, it was decided he should be born in the family of Čākya. He enters his mother's womb by the right side. The mother sees miraculous visions. She travails in a garden. A storm disperses her attendants. She holds the branch of a tree, and hangs downward with her face lifted up towards heaven; in that condition the Buddha is born. On the seventh day after his birth, his mother dies. He is named Sarvārtha-siddha by his father. Dēvarṣi, the divine Ṛṣi, Asita comes to see the boy and predicts that he will renounce the world. The Dēvaputra Mahēçvara also predicts the same thing. He is nursed by his stepmother, Mahāprajāvatī. He learns to read and write various alphabets from Viçvāmitra, the teacher of boys. He goes to see villages; he falls into a trance under a Jambu tree,

¹ [See the *Proceedings* of the Society, for Dec. 1894, p. 135, where the paper is printed at full length. Ed.]

² [The *Vaiçākḥī Pūrṇimā*; See *Proceedings*, p. 137. Ed.]

where he is discovered by his father; then he is married; he is examined in his knowledge. He conquers the whole Čākya race by his prowess and marries Gōpā, the daughter of Daṇḍapāṇi. Then comes the well-known story about the four excursions, and his famous renunciation. During his prolonged meditation under the Bō tree at Bōdh-gayā, Māra comes to tempt him, first with an army of terrible demons and then with a host of beautiful damsels. But the Buddha rises superior to the temptations, and succeeds in turning the wheel of law (the *Dharma-cakra*). The *Lalita-vistara* ends here, but there are other works, such as the *Mahāvastu-avadāna*, which give a history of his ministry and of his Nirvāṇa at Kuçinagara.

The *Čri-dharma-maṅgala* begins with the usual salutations to Gaṇeṣa, Sarasvatī, &c. The real work opens with Dharma, as supreme Brahma, creating Vidhi, Viṣṇu and Čiva. In the beginning of the Kali-yuga, he thinks deeply in his highest heaven that people are not worshipping Dharma. Just at this time Hanumat presents himself before Dharma, and in consultation they determine to send to the earth one of the Apsarases, or dancing girls of Indra's court, in order that she may propagate the worship of Dharma.

This dancing girl is born as the sister of the wife of the king of Gaṇḍa, the son of the great King Dharma-pāla. Her brother Mahāmada is the minister of the king. The king gives the girl in marriage to Karṇa-sēna, one of his great feudatories, against the wishes of his brother-in-law, and the minister takes a vow of eternal vengeance against his sister and his brother-in-law.

Raṅjāvati the royal sister-in-law, on the advice of Ramāi Paṇḍit, worships Dharma at Cāmpāi, that she may get a mighty son. In order to please the deity, she lays herself down on a piece of plank with iron spikes driven through it, the instrument on which jute is teased by weavers. She immediately dies, and remains dead for three nights. Then there is a storm. Dharma-rāja presents himself before her, and she regains her life and gains the boon she wanted. Lāusēna, her son, is an incarnation of Kaçyapa's son, perhaps Indra. His athletic training is given in detail. The minister of the king of Gaṇḍa makes many attempts to take his life. Dharma saves him. He is at last summoned to Gaṇḍa. On his way to the capital, he kills the tiger Kāmadala, in the depopulated city of Jalandara. At Jāmāti and at Gōlāghāṭa, women of all descriptions throw many temptations in his way, but in vain. On his arrival at Gaṇḍa, the minister contrives to send him on a distant and hazardous expedition against Kāmarūpa. He subdues the king, compels him to pay tribute, and takes his daughter in marriage. The minister sends him on other dangerous expeditions, and he succeeds in all of them.

The minister himself worships Dharma and brings in Lāusēna to help him. He throws him into prison, gets his father and mother into his power, and agrees to release them only on condition that Lāusēna should cause the sun to rise on the west. Lāusēna proceeds to Hākanda, the westernmost point imaginable, beyond Haridvāra, beyond Mathurā, beyond Kurukṣētra, near the mountain where the sun sets. There he sacrifices his own person, divided into nine parts, in the fire, and all his followers do the same. One animal survives,—a dog. Dharma brings them to life, and makes the sun rise in the west. Lāusēna gets his parents released, and goes back to his kingdom. Dharma presents himself in his capital, and takes him and his followers to heaven.

This is the story of *Črī-dharma-maṅgala*. It has the following striking points of resemblance with the story of the life of the Buddha.

1. The Buddha in the Tuṣita-heaven thinks of taking his last birth on earth.

Dharma in the highest heaven, thinks of sending some one on earth to propagate his worship.

2. The Buddha selects the best royal family for his birth.

Dharma selects the most virtuous royal personage to become the father of Kaçyapa-nandana on earth.

3. The Buddha's mother, Māyā-dēvī, gives birth to her noble son, while hanging from the branch of a tree. This tree is said to be a Pīpal tree by some, an Açōka or a Čāla by others.

Rañjāvati, in order to get a son by the favour of Dharma, lays herself down on a *Čāla*—a plank with iron spikes in it. Now *Čālē bhar dēoyā* would apply equally to hanging by the branch of a Čāla tree and to lying oneself down on a *Čāla*, the planks with spikes driven into it.

4. The Buddha's mother dies immediately after the birth of her son.

Lāusēna's mother dies in order to get a son.

5. A storm disperses the crowd of attendants of the Buddha's mother, when he is born.

A storm precedes the obtaining of the boon by which Rañjā gets Lāusēna as her son.

6. The stories of athletic exercises bear very close resemblances to each other.

7. The story of the temptation of the Buddha divides itself into two parts, *viz.*, temptation by fierce demons, and temptation by beautiful damsels, or in other words by Māra-sēnā and by Māra-kanyā.

The story of the temptation of Lāusēna, too, divides itself into two parts—one, temptation by the tiger Kāmadala, which is a modern form of the word Māra-sēnā,—and the other, temptation by the ladies of Jāmati and the public women of Gōlāghāṭa.

8. The Buddha kills an elephant and sends it off several miles.

Lāusēna also kills an elephant.

9. While the Buddha was meditating under the Jambu tree, the progress of the seven Ṛṣis (the constellation of the Great Bear) through the skies was stopped by his divine power.

Lāusēna compels the sun to rise in the west.

10. The Buddha obtains Nirvāṇa and goes to the Sukhāvati heaven designed for Buddhas only.

Lāusēna, and all his followers, go in their terrestrial forms to the highest heaven of Dharma.

There are these and other points of resemblances between the two stories, but the points of difference are many, various and striking. In the whole of *Çri-dharma-maṅgala*, the word Buddha does not occur. The only word of the Buddhist Trinity that occurs is Dharma;—not always that abstract idea which Buddhas designated by the word, but a great deity—the highest of all. On some occasions the deity Dharma is identified with the abstract quality of virtue or holiness, but such instances are rare. The stories of the Rāmāyaṇa and Mahābhārata are cited in various instances, but not a single story about Buddhas or Bōdhisattvas. The writer of the work himself was a worshipper of Rāma, and so in his work Hanumat plays an important part as the attendant of Dharma. In fact there are many passages in the work in which Rāma, Viṣṇu, and Dharma appear to be all blended together into one, while in others Dharma is made superior to Viḍhi, Viṣṇu and Çiva.

The Buddhist word *Nirvāṇa* occurs only once, and that in the Buddhist sense of putting an end to transmigration.

From reasons already advanced in my previous papers, it would appear that Dharma worship is the same as the latest or the Tantrik form of Buddha worship. It was confined to the very lowest classes of society—to Hāḍis, Dōms, Pōds, Bārui, &c. At the beginning of the last century a Brāhman poet well-versed in Hindū lore, observed this strange form of worship and wrote a great poem on it. He took the story from the worshippers and moulded it in his own fashion. The story of the Buddha's life, so simple in Pāli, got mixed up with legends and superstitions of twenty-five centuries and was then moulded by a Brāhman in such a manner that even the Buddha's name is not to be found in it. The Brāhman's work is certainly an echo of the Buddha's life, but it is a distant echo.

The Dōgām Mint.—By SURGEON-CAPTAIN W. VOST, I. M. Service.

(With a Plate.)

[Read May, 1895.]

The map in Mr. Stanley Lane-Poole's *History of the Moghul Emperors of Hindustan* does not shew the position of Dōgām. Mr. C. J. Rodgers so late as 1894 has stated, "I do not know where this place was. It is sometimes styled Dāru-l-islām and sometimes Dāru-l-khilāfat, so it must have been a place of great importance."

When I came to Bahraich (Bahrāic), the number of dams of Akbar of this mint that I was able to collect in a few days attracted my attention. At Gōṇḍā, the nearest town to Bahraich on the Faiṣābād side, I searched for them but could get comparatively few, while at Nānpārā, some 22 miles nearer the Nēpāl Frontier, they again were plentiful. This led me to believe Dōgām must have been somewhere in the neighbourhood of either Bahraich or Nānpārā, and to inquire if anyone knew, or had traditions, of such a place. In a few days I was told that in former times there existed a city called Dōgāñ, 4½ miles or so to the North-West of Nānpārā (at which there is a station on the Bengal and North-Western Railway), but that it was now represented by an insignificant village by name Dōgñ, surrounded, however, by the extensive remains of an old town. Every year after the rains, numbers of Dōgām coins are found about the site on which Dōgñ (دوگن) now stands, and find their way to the melter's pot. At the present time one would not have much difficulty in adding two to three dozen to his collection at either Nānpārā or Bahraich. As this can be done at no other place I know of, I believe there can be little doubt the site of Dōgām may now be taken as settled at the *dih* indicated.

In the accompanying plate (Plate VI) I give coins of Akbar and Shāh Jahān minted at Dōgām. We should therefore also expect to discover some of Jahāngīr, but none are known at the present time.

Dōgām on some specimens of Akbar's time to my thinking reads Dōgāw (دوگانو.) On those of Shāh Jahān, there is no doubt that Dōgām (دوگام) is the correct spelling. Mr. Stanley Lane-Poole at p. liii. of

his *History* says, "Mr. Rodgers and Mr. Oliver (*Journal, Asiatic Society, Bengal, LV*) have read the mint *دوگام* as *دوگانو*, Dōgānw: but, while it is most probably the same name, there can be no question that the last letter on the copper coins Nos. 263, 271, is *م* not *نو*. Several places called Deogaon are mentioned in Abū-l-faḡl's list of Todar Mal's rent roll."

The coins of this mint now shewn were all, with the exception of Fig. 14, stated to have been found at Dōgāñ and were obtained at Bahraich and Nānpārā by me. I have one dated 984 H. with the epithet *دارالخلافة* and others beginning in 986 H. with a second epithet, so that between these years there was a change in the title for some reason. In the Lahore Museum Catalogue (1891) one is given with the epithet *Dāru-l-khilāfat*, dated in 986 H., and also another dated in 989 H. with the same epithet. I think the title, or date, on the latter may have been incorrectly read. If there be no doubt about the one dated 986 H., then the change of epithet would appear to have actually taken place in that year, for I think there can be no question that on coin Fig. 1 of the plate illustrating this paper *Dāru-l-khilāfat* cannot be read. Specimens with the second epithet are much more frequently seen. It has usually been read *دارالاسلام*. From the obverses of Figs. 1, 2 and 3 of the plate it can be seen that there are not four *alifs*, and, therefore, that reading must be incorrect. The right reading appears to be *دارالسلام*. At one time I believed *دارالتلاوت*, the *Abode of Meditation*, was the epithet, or possibly *دارالتلاميذ*. I preferred the former, for I took what seems the last letter on Fig. 2 to be *و* and not *م*. To the eye this letter is like, all but the curved part, the *و* in Dōgāñ on the same coin. Moreover, Figs. 3 and 9 shew above the first letter of what I thought was *تلاوت* a mark, like an inverted V, which I believed might represent the two dots of that letter. A mark nearly the same is used in writing at the present day for that purpose. I have seen very few with the mark I describe. Some have a cluster of dots, like Fig. 1, while others are without marks of any kind.

Between the Ghāgrā and Raptī rivers there is a belt of comparatively high tableland. "On the edge of this same tableland and on the bank of the Sarjū, about 4 miles west of the present town of Nānpārā, there exist the remains of a very large and most substantially built town. The houses, (for the ruins appear to be merely those of private dwellings and not of temples or tombs), are built of burnt bricks and it must have been a place of considerable importance. It bears the name among the country folk of Dūgāon and is unmistakeably the same city as that mentioned by Abū-l-faḡl in the *Ayīn-i-Akbarī* as a commercial centre of mark, the trade with

the hill people being considerable. Here also there was a mint for copper pice. As we are told that Nāṣīru-d-dīn during his brilliant administration of this district made his power felt even in the hills and rendered Bahraich prosperous in the extreme, it is not improbable that it was under his auspices that this town was established. By the end of Shāh Jahān's reign it was deserted, the legend being that a saintly mendicant in a fit of ill-humour cursed it so effectually as to cause the inhabitants to leave it "en masse." The tomb of the spiteful old man, Shāh Sajan, is now the resort of pious pilgrims and a large fair is held on the site of the old town."

The above quoted extract is taken from the *Report of the Revision of Settlement of the Bahraich District, Province of Oude*, printed in 1873. It appears to have escaped attention. Mention is made of Dōgām in Colonel Jarrett's translation of *Aīn-i-Akbarī* at page 172, Vol. II. It is there stated, "in the vicinity of the town (Bahraich) there is a village called Dōkōṇ which for a long time possessed a mint for copper coinage." Under the heading "Nanpara Pargana" the Gazetteer of the Province of Oudh, 1878, records that "Dugāon is spoken of in the *Arāish-i-Mahfil* under the name of Deokhan or Deokan." The Gazetteer says, too, "Dugaon" was deserted in one day on account of Shāh Sajan's curse. On the 22nd December 1894 I travelled *viā* Rājapur and Kēṣwapur to visit Dōgāō. Nānpārā was formerly known as Tappā Salōnābād from Salōnā Bēgam, wife of Prince Dārā, son of Shāh Jahān. The road here and there has bricks appearing above the surface, and in Kēṣwapur itself there is a piece of cemented road which the villagers say was part of the chief thoroughfare that led into the city. The first vestiges of Dōgāō are distinctly visible just beyond Kēṣwapur. Here there are a number of mounds, and a well 10 feet in diameter. This is now partly filled up by fallen bricks. About two miles further on, the ruins become more plentiful. Five years ago, when the Bengal and North-Western Railway was being made, many hundreds of cartloads of ancient bricks were taken away. At that time what was left of the standing houses was dismantled. The foundations now only are left. An extension of the railway at right angles to the present line is contemplated. In a few years it is probable nothing will remain to tell of the whereabouts of the town. For this reason it may be well to put on record that the village Takiā stands at the north-west, and Banjariā at the north-east corner of the city, while the hamlets known as Amrāyā, Munupurwā and Dōgō are actually on the ruins. The city appears to have been, at all events it is now, bounded on the north by the Mathkhanoā Jhīl, on the west by the Sarjū river, on the east by the Kajhōwā Jhīl, and on the south by the Pajōwā Jhīl.

The people of the villages named use the old city wells. There are still a great number of these all about, with the cement lining still perfect. Some only require cleaning out to be almost as good as ever. At the time of my visit the ground was covered with mustard crops, and the different fields were separated by ridges of broken bricks. Some of the bricks were perfect. They were mostly thin, measuring about 10 inches square. From one well a large tree has grown. It was close to this that an old inhabitant pointed out to me the square foundation of a building which, he remembered, when a young man had high walls and was surrounded by a ditch, perhaps a moat. It was here, he said, Rājā Har Singh lived in Dōgām-garh.

There are traditions of other Rājās who lived in the city. Their names are Durag Mall and Sohail Dah. The last is no doubt one of the many names of the famous Sōhil-dēō who lived about 1000 A.D., and defeated Sayyid Salār Mas'ūd, the nephew of Sultān Maḥmūd. I cannot make out who Durag Mall was. Har Singh may possibly be the Raikwār Harhardēō who rendered Akbar such service against Idgār, the rebellious Governor of Kaṣmīr, and who after a long absence returned to the district in 1590 A.D., to find he had been considered dead. He refused to oust his son Jitdēō from the *gaddī* and retiring to Tappā Bownrahā married the Brāhman owner's only daughter and child.

The ruins of Dōgāñ cover ground over a mile in length and about half that in width. I have no doubt at one time the town must have been much bigger. The people hereabouts assert it was connected almost the whole way along Anārkallī, an old bed of the Ghāgrā, with Bahraich, and in the opposite direction, with only a slight interval, extended as far as Parsā and Khatghar, places all a long way off. The name of the city implies there were two villages under one designation. It is likely the other was not far distant from the ruins described.

The following account of what happened to Dōgāñ is both new and interesting. Once upon a time to the city, which was a populous and wealthy but very wicked place, there came a faqīr who was so enraged by boys of the city constantly throwing mud at him and making his life a burden, that he cursed them and prophesied that the city would be punished for its deeds. After some time a paṇḍit learned in astronomy made it known from observations he had taken, that the city would be totally destroyed in 3 days' time. He that night got his property together and with his family secretly left for Nānpārā, first barring his house from outside. Before starting he had a shallow pit dug in the courtyard of his house, and into it put three pigeons one above the other, but each separated by a basket. One of the pigeons was in

full plumage, the second had some feathers cut short, and the third had also feathers clipped but shorter than those of the second pigeon. The following morning the people wondered why the house was not opened as usual, and receiving no reply to repeated calls, broke open the door to find no one within. Discovering the pit in which the pigeons were, curiosity prompted them to raise the baskets to see what was under them. The first pigeon immediately flew away, the second was found half dead and got out of the pit with difficulty, while the third was dead. After matters had been discussed, it was concluded that those who fly at once will escape like the first pigeon, those who delay till the following day would meet with great trouble like the second pigeon, and those that stay behind till the third day would share the fate of the third pigeon. So it happened. Those who believed in the prophecy and left at once were saved. The next day a terrible earthquake occurred, and many were injured. The third day the whole town sank to the ground and many people died.

By others this prophecy is attributed to a banker in whose house the pigeon incident is also said to have taken place. One day only in his life had he ever forgotten after his day's business was done, to hand over his money bags to his wife's Kahārin servant named Konsiliā. Having to go outside shortly after his return home, an idea possessed him that two women were at that moment persuading Konsiliā to steal the bags. He made for home to find she had not been given them that day, nor had he, as usual, had his ḥuqqah and a drink of water after finishing it given him on his return. The whole affair was so mysterious and unusual with him, he thought something dreadful must happen.

Those who survived made their way to the larger villages and towns round about, viz., to Nānpārā, Bahrāich and Çiōpur in the Bahrāich district, to Gōṇḍā in that district and to Khairābād in the Sītāpur district.

These legends have been related to me by one named Çālagrām, a banker at Bahrāich. His ancestors lived in Dōgāñ.

Nawāb Aṣafu-d-daulah of Audh was in the habit of visiting Takiā to shoot big game and had over Shāh Sajan's grave there a building erected to preserve the spot. The whole was carried away in August last, by the swollen Sarjū eating into the bank on which the grave stood. A faqīr pointed out the spot to me, and with his finger the bricks in the bed of the river below.

In the cold weather I discovered in one of the villages at Dōgāñ an old manuscript in Hindī verse composed by some one named Muni Dās. The manuscript is evidently a copy of an older one named the *Janam Tantō*. An extract from it is appended to this paper. In it

“Dang Dugoun” is stated to be in the Rāj of Hari Singh. It goes on to relate that while largess was being distributed and festivities held in honour of the birth of the Rājā’s son, Khil, a jōgī named Hardam had not been able to get food for two days and in consequence cursed the Rājā’s kingdom. Khil at 5 years of age became a jōgī and led a wandering life. Nothing about Bahrāich is recorded in it.

Bahrāich and Gōṇḍā are frequently coupled together by natives when speaking of either. It is probable that “Dang-Dugoun” is another example. In the district maps Dāng is shown in the neighbouring hills to the north. Dāng-Saliānā are now spoken of in the same way. In the ‘Ain Akbarī the only named mehal in the Bahrāich Sarkār at all like Dōgāñ in sound is Wankdun. For this Colonel Jarrett in a footnote gives Dangdoun and adds “almost every name has an alternative spelling.” Dangdoun I think may be a contracted form of Dang Dugoun.

Weights
in grains and
measurements
in English inches.

I. AKBAR.

PLATE. VI FIG. 1.

Obverse.

In a circle, with circle of dots outside:—

315

دارالسلام

0·9

فلوہی

دوگا...

(ضرب)

Reverse.

Circle, with circle of dots not visible on this coin:—

شش و

ہستاد

(986H.)

نہصد و

سنة

ف

(No date in figures in this position visible).

The three-looped ornament distinctive of this mint is attached to the upper part of د of نہصد.

FIG. 2.

Obverse.

As on Fig. 1, but دوگانو.

320

0·9

Reverse.
هفت و هشتاد
نصد و
سنة
في
۹۸۷

(987H.)

FIG. 3.
Obverse.

As on Fig. 1.

322
0.9

Reverse.
As on Fig. 2, but not complete.

FIG. 4.
Obverse.

296
0.85

... تنک ؟
وگا و [ن ؟]
ضرب

Reverse.
شش
ن [و د و
نم [صد و

(996H.)

I cannot make all the letters on the obverse into words.

FIG. 5.
Obverse.

As on Fig. 1.

316
0.8

Reverse.
سه
هزار و
سنة
في

(1003H)

Ch

Date in figures partly visible.

Weights
in grains and
measurements
in English inches.

As on Fig. 2.

159
0·7

FIG. 6.
Obverse.

Reverse.

سنة
هزار و
سنة في

(1003H.)

FIG. 7.
Obverse.

As on Fig. 1.

147·5
0·65

Reverse.

يا (ز)
هزار (ر د ه)
سنة في

(1011H.)

FIG. 8.

Obverse.

As on Fig. 2.

317
0·7

Reverse.

هزار (ه)
ار سيز
سنة
في

(1013H.)

FIG. 9.

Obverse and Reverse.

As on Fig. 8.

80
0·55

Unique.

II. SHAH JAHAN.

FIG. 10.

Obverse.

Æ
159
0·7

شاه جهان
فالومی

Reverse.

۱۰۵ ...

(105 * H.)

(?) ... سنه

دوگام

Unique.

FIG. 11.

Obverse and Reverse.

As on Fig. 10.

Æ

160

0·7

Unique.

FIG. 12.

Obverse.

Æ

71

0·55

شاه جهان

فلوس

Reverse.

(?) ... سنه

دوگام

Unique.

FIG. 13.

Obverse.

Æ

71

0·55

فلوس

Reverse.

دوگام

Unique.

FIG. 14. [W. CROOKE, C.S.]

Obverse.

20·5

·38

....

[ج] [ن] (?)

Reverse.

فل [و] [س]

دوک [ا] [م]

ضرب

Unique.

I have not seen any coins of the Ilahī years of the Dōgām Mint, nor any with the name Ādōgām.

APPENDIX.

I once went towards the North.
 I am going to describe about Dang Dōgāñ together.
 There was a Rājā, Hari Singh.
 A son was born to him.
 I sketched out the way to mercy.
 He was distributing money extravagantly,
 He invited the Rājās of various countries.
 Singing and dancing was going on daily.
 There was a Yōgī named Hardam.
 He starved for want of food.
 After two days he cursed.
 Hari Singh was frightened to hear it,
 And said, "What offence have I done to you?"
 "You did not inform me in the Darbār;
 "I would have provided you with the food
 "That you liked.
 "I stand guilty before you.
 "Who can remove the curse?
 "Have mercy upon my kingdom."
 Hari Singh stood with folded hands.
 "Listen to my entreaties, O! Jōgī,
 "Revoke the curse and pardon me."
 The Jōgī replied, "Hear me.
 "Saints are in trouble in the world.
 "Disease and trouble prevail in the Iron-age (Kaliyuga).
 "O! Rājā, now adopt good ways.
 "Hear Hari Singh, there is a son to you;
 "He has come to your royal doors.
 "He is a perfect Jōgī by birth.
 "He will relieve you from the curse.
 "He will prefer Jōg to Rāj.
 "Who can tell his qualities?"
 On hearing these words Hari Singh
 With his wife fell on his feet.
 In the barren days of the Golden-age (Satjug)
 Hari Singh gave up his ghost,
 Relinquishing the hopes of Rājā,
 And coronating his son as the Rājā.
 I give a description of the child.
 He, leaving his kingdom, deserted to the jungle.
 He was of full 5 years of age.

He well churned his body.
 Praise to his conscience and his deep devotion !
 He was altogether free from passions and desires.
 His subjects begged him,
 That they are in trouble for want of a ruler.
 They brought him home against his will,
 And said " Have your senses left you ? "
 He replied, " I am not a fool, but the world is so.
 " O ! mother, you are fond of Rāj."
 When any one else admonished him again,
 That you, being a child, are too obstinate,
 He replied, " I am not your child ;
 " I can discover the accounts of all the nine parts of the world
 in a moment."
 His mother asked him the details :
 " You are only 5 years' old.
 " In what places did you practise Jōg ?
 " Tell me an account of it,
 " O ! child, nobody did so in my family.
 " I tell you truly."
 Kīl said, " Hear, my reverend mother,
 " I shall tell you the whole story."
 The mother said :
 " Have you got no parents ? "
 Kīl said, " Hear my respected mother !
 " I shall give you a further description.
 " Mardan Singh was a Rājā.
 " I fully describe his asceticism.
 " I, seeing that, remained there long.
 " His country was void of desires.
 " I passed the rainy season in the jungle there,
 " Where I devoted myself to the service of all the deities.
 " There I remained alone.
 " I always delighted in divine contemplation
 * * * * * *
 * * * * * *
 I relate a Jōg of mine (in a previous life).
 I was at Pānipat Karnāl (Kandāl in manuscript).
 There was a Jōgī, named Bhartihāri.
 His Jōg was unfathomable.
 He was a devotee, four times greater than others.
 In Sankaldip there was a Guru (priest).

His name was Agni Sāh, perfect in every way.
 He was practising Jōg, and was happy.
 Mōchandra went to pay his respects to him.
 He listened to his words with attention.
 Mōchandra imbibed Jōg fully from him.
 The reverend Guru made God perceptible to him.
 The world was going on as usual.
 Lots have been received and lots prospered.
 One, Gōrakh, lived in Kāncha Dēç.
 Hear O ! Hermits, he was admired by all.
 Mōchandra's Jōg now I describe.
 The whole world knows it.
 He was practising Jōg in his own house.
 I describe further the ancient accounts.
 Bhartrihāri had a true love to God.
 He did not care a bit for Rāj.
 There was another Bhartrihāri.
 He had no home and was in distress.
 His parents were poor.
 Now I describe his history.
 One day he was sold by his parents,
 And afterwards was thrown in a sea.
 He remembered God, the waves became powerful.
 The Almighty saved him.
 Since then people called him obstinate.
 He grew tired of begging about here and there.
 He was suffering great pains.

* * * * * *

Kil said to his mother :

“ Once I was at Ambapur

“ There was a Jōgī named Khind.

“ Some two or three days past there.

“ Khind told me his history.

“ He gave me a description of

“ The places he had visited.

“ My ears became tired of his long accounts.

“ His history is indescribable.

Khind said, “ Hear, O theosophist, possessor of divine wisdom,

“ I relate to you what I know.”

He became silent for a moment.

“ Hear Khind, I will describe my account.

“ I went towards North.

“ Dang Dōgāñ was a city there.
“ The Rājā reigned for a long time.
“ The Rājā’s name was Hari Singh.
“ The whole world knew him.
“ He was blessed with a Jōgī son.
“ His name was Kīl.
“ There was a meditative Jōgī in that town.
“ His name was Hardam.
“ Dancing and singing was going on there.
“ None provided food for the Jōgī.
“ He pronounced an irremediable curse.
“ Hear O ! Khīnd, he was a peculiar Jōgī.
“ Hearing the curse the Rājā died.
“ A son was born to him.
“ The prince’s name was Kīl.
“ He used to go to the jungle night and day.
“ His mother told him.
“ Hear O ! child, you are behaving childishly.
“ The child was 5 years old.”
Khīndra told the Jōg of that time.

* * * * *

MUNI DĀS.



“ Dang Dōgāñ was a city there.
 “ The Rājā reigned for a long time.
 “ The Rājā’s name was Hari Singh.
 “ The whole world knew him.
 “ He was blessed with a Jōgī son.
 “ His name was Kīl.
 “ There was a meditative Jōgī in that town.
 “ His name was Hardam.
 “ Dancing and singing was going on there.
 “ None provided food for the Jōgī.
 “ He pronounced an irremediable curse.
 “ Hear O ! Khīnd, he was a peculiar Jōgī.
 “ Hearing the curse the Rājā died.
 “ A son was born to him.
 “ The prince’s name was Kīl.
 “ He used to go to the jungle night and day.
 “ His mother told him.
 “ Hear O ! child, you are behaving childishly.
 “ The child was 5 years old.”
 Khīndra told the Jōg of that time.

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MUNI DĀS.

Tibbat three hundred and sixty-five years ago.—By MAJOR H. G. RAVERTY,
Bombay Native Infantry. (Retired.)

[Read April 1895.]

At the present time the exploration fever in Asia appears to be chiefly directed towards Tibbat,¹ miscalled “Thibet,” “Tibet,” and the like, therefore it may be interesting to give an account of that region—of its western and northern portions chiefly—as it was seen by its first explorer nearly four centuries since.

I refer to the Mughal Prince, the Mīrzā, Muḥammad Ḥaidar, the Gūrgān, of the Dōghl-āt tribe of the Mughals, son of the Mīrzā, Muḥammad Ḥusain, the Gūrgān, who held the Government of Shāsh, or Tāsh-kand, on the part of the sovereign of Kāshghar, to whom he was related, Muḥammad Ḥaidar’s father being descended from Amīr, Bulācī, the first Amīr of Kāshghar who embraced the Muḥammadan faith. Sultān Sa’id Khān, the ruler of Kāshghar and Khutan, and their dependencies, at the period I am writing about, and in whose service Muḥammad Ḥaidar was, and to whom he was also related, married his sister, and gave him his own sister in marriage, hence Muḥammad Ḥaidar, like his father, and many others, not Amīr Timūr alone, as has been commonly supposed, is styled *Gūrgān*, that is to say, one who has married into the family of the reigning sovereign. Muḥammad Ḥaidar’s mother, likewise, was the younger sister of Zāhiru-d-dīn, Muḥammad Bābar’s mother, they being the daughters of Yūnas Khān, who held the Government of Andījān, the capital of which was Shāsh or Tāsh-kand, and who was a direct descendant of Caghatāe Khān, one of the sons of the Cingiz or Great Khān of the Mughals.

Before giving Mīrzā Ḥaidar’s account of Tibbat¹ it may be well to refer briefly to what the old Muḥammadan writers say about it, but,

¹ The word is spelt by all eastern writers, ^{تبت}—Tibbat—and in no other way.

The actual meaning of the word is “fine wool,” which is obtained from the roots of the hair of goats, and which is woven into fine and soft fabrics—*shāls*—which is the signification of this latter word.

unfortunately, they are much more brief in their accounts than we could have desired.

‘Ubaidu-l-lāh, son of ‘Abdu-l-lāh, son of Khurdād-Bih, who died in 300 H. (912 A.D.), in his *Kitābu-l-akhbar*, as quoted by the Gardāizī in his *Zainu-l-akhbar*, mentions the well-known tradition of the Ḥamīrī rulers of Yaman in Arabia having invaded Māwarāu-n-nahr, and also of the invasion of Tibbat by one of the same race. ‘Ubaidu-l-lāh states, that there was a prominent man among the Banī Ḥamīr whose name was Ṣābit, who was much trusted and depended upon by the Maliks of Yaman, whom they style Tubbā’yawa’. On Tubba’ conferring the lieutenantcy, or vice-royalty of the country upon Ṣābit, the latter’s mother sent him a missive, saying: “One of the Tubbā’yawa’ set out towards the east, and used great efforts until he reached a country the verdure of which was gold, and its earth musk, and its grass (herbage) incense [fragrance, also the plant cinque foil, called the “Khik-i-Maryam” or “Panjah-i-Maryam—the Virgin Mary’s Palm,”], its game the musk deer, its mountains snow, and its plains most pleasant.” When Ṣābit read this missive he became very desirous of proceeding thither; and having fitted out a large army, he set out towards that country. When he reached Tibbat he found that all he had been told was correct. * * * * He remained in that part, and got the title of Khāqān. * * * * But the route into Tibbat from Khutan,¹ until you come out on it, lies over lofty mountains, which contain inhabitants, and in those mountains are numerous animals, consisting of sheep, cattle, and wild sheep.² From thence you reach Sālsān [سلسان in another MS.], beyond which a bridge has been placed from one side of a mountain to another.³ They say in

¹ Khutan, not “Khoten,” for the letters with which it is written will not admit of such a mode of writing or pronunciation—according to the Tibbatī traditions, was anciently called *Wu-than*, at which period it was one of the strongholds of Buddhism. “Counting the *wihārs* in and outside the city of Wu-than, there were sixty large *wihārs*, ninety-five of medium size, and four-hundred and forty-eight temples.” See “*Journal*” for 1886, page 195.

² The *qucqār*, also called the snow sheep.

³ When Mīrzā Abā Bīkr, defeated by Sulṭān Sa‘īd Khān in 920 H. (1514 A.D.), had to fly from Yār-kand, he retired to Khutan, but finding it was impossible to remain there, he retired towards the Qarā-naqū Tāgh. On arriving there, hearing that the Mughals were in pursuit, he again fled after destroying as much of his immense baggage as he could, and pouring his treasures into the river Akāsh, which flows through Qarā-naqū Tāgh, from the top of the bridge; as the road was very narrow, and his flight was impeded by the immense amount of baggage and treasure, he took only such things along with him as could conveniently pass by that narrow route. He then set out; and when his pursuers reached his last halting place, they found that he had crossed the Qarā-naqū Tāgh, and had entered Tibbat.

this wise, that the Khutan people erected it in ancient times. Beyond this bridge of Tibbat Khāqān, there is a mountain range, that, when people begin to ascend it, it will take their breath away [*dam-i-mardamān ba-gīrad*. The name of this malady it will be observed, is *dam-gīrī* from Persian *dam*, 'breath', and *gīrī*, 'taking', 'seizing', etc., from the verb '*giriftan*' to seize, etc.], so that they cannot breathe, and their tongues become heavy, and many persons die thereof. The people of Tibbat call this range the Kōh-i-Zahr, or Poison Range. When people proceed to Kāshghar from thence [Tibbat], they go by a direct route between two ranges of mountains to the east [sic. in *MS.*], and pass over it, and reach a tract of country which they call Ūz-kand. This tract is forty *farsakhs* in extent, and half of it is mountain, and the other half is very rough and furrowed.

The chronicler, Abū Ja'far, Muḥammadu-t-tabarī, who wrote about the same time as the writer just quoted, relates, that Shamir, surnamed Zū-l-janāḥ, a nephew of Tubba'u-l-aṣghar, the Ḥamīrī king of Yaman, invaded China. It came about in this wise, that the ruler of Hind sent his ambassador to Shamir with presents, consisting of silken fabrics, frankincense, musk, and other rarities. Shamir inquired if all these precious things were the produce of Hind, and was told that most of them came from Cīn, a country the 'Arabs had not before heard of. Shamir was so stimulated from the account given to him of Cīn, that he resolved to undertake an expedition into that country. Some other writers, like 'Ubaidu-l-lāḥ', just quoted, say, that Shamir was commanded to undertake this expedition by one of the kings of Yaman, whom the others say was Tubba'u-l-aṣghar, but he lived many years subsequent to Shamir. The Ḥamīrī prince is said to have led an army under one hundred standards, and under each standard were one thousand men, across the Jihūn from the territory of Balkh, and from thence to the frontiers of Hind,¹ where he himself remained while he despatched part of his forces against Cīn. This force having been defeated by the Cīnis, Shamir resolved to proceed in person with the rest of his army, and he set out through the country of Turkistān, skirting the territory of Tibbat, in which he left a force of 12,000 men as a reserve. Shamir succeeded in Cīn, and returned from thence

The name of this mountain still exists, but, in Walker's map of Turkistān it appears as the name of a halting place, under the name of "*Karangotak*," about one hundred and three miles south of Khutan, and the bridge over the Akāsh river was immediately north of it. The narrow route, and the bridge appears to be the same as noticed above.

¹ The *Ṭabaqāt-i-Nāṣirī* says he went by way of Kābul to the frontiers of Hind.

through Turkistān towards Hind [the borders are doubtless meant, and by a different route from that by which he went], with a vast amount of booty; and from thence conducted his forces back to Yaman, having been absent on this expedition for a period of seven years. "Those 12,000 men were never withdrawn from the skirts of the territory of Tibbat; and vestiges of them are still to be found in Turkistān in that direction." The Tājzīks of Tūrān are their probable descendants.

Shamir is also said to have destroyed, at the outset of this expedition, the ancient capital of the Sughd, and to have founded another town in its place, which was named Shamir-kand, *kand* in Turkī meaning a town, which 'Arabs change to *qand*, and which in course of time grew into a city, and its name to Samr-qand. According to the chroniclers quoted, Shamir lived in the time of Kai-Gushtāsib and Bahman, rulers of Ī-rān-Zamīn. It was the former who removed Bukht-un-Naṣṣar (Nebuchadnezzar) from the government of Bābal, for his cruelty towards the Banī Isrā'īl.

The 'Ajā'ibu-l-baladān says much the same as ut-Ṭabarī respecting the Tubbā'yawa' invasion.

The "Kitāb-i-Masālik wa Mamālik" says: "If one desires to proceed from the east [Cīn] towards the west, by the country of the Nāemāns, the territory of Khirkhīz, the Taghar-i-Ghuzz, and Kimāk, towards the sea, it is a journey of nearly four months. * * * * The country of Tibbat lies between the land of Khirkhīz and the kingdom of Cīn. Cīn lies between the sea, the land of the Ghuzz, and Tibbat, etc."

Ibn Hauqal who finished his work in 366 H. (976 A.D.), states, that *he saw* a gate at Samr-qand, the front of which was overlaid with iron, and on it was an inscription in the Ḥamīrī language, saying, that "from San'a to Shamar, or Samr-qand, is a distance of one thousand *farsakhs*."

The Tasmiyatu-l-baladān says that in those early times Samr-qand was called Cīn!

In his history, entitled the "Tārīkh-i-Rashīdī," the Mīrzā, Muḥammad Ḥaidar, first refers to Tibbat in the following words.¹

"On the west side of Kāshghar likewise, a great range extends, which branches off from the mountain ranges of Mughalistān, and runs from the north towards the south. The writer of this work has traversed the mazes of this great range for a distance of six months' journey, and even then had not reached the extremity thereof, as will presently be explained." * * * *

¹ I may mention that I translated this account of Tibbat from Mīrzā Ḥaidar's work some seventeen years ago; and other extracts have appeared in the *Translation of the Ṭabaqāt-i-Nāṣirī*, and my *Notes on Afghānistān*, etc.

He subsequently gives the following account of his expedition into Tibbat, which I will render in his own words.

ACCOUNT OF THE HOLY WAR IN TIBBAT.

“Sultān Sa‘īd Khān having come to the determination of undertaking a holy war against the infidels of Tibbat, it is necessary to give some account of that country. It lies in such a position that few travellers can manage to reach it, on account of the exceeding difficulty of the routes. It is a maze of mountains and valleys, rough, and furrowed with formidable passes and tremendous defiles; and is, in every respect, a most difficult and inhospitable region. What from the excessive keenness of the air, the paucity of forage, the scarcity of fuel, and the lawless and obdurate people who infest the routes and plunder those who happen to fall in their way, there are few travellers who have effected a passage through it.¹ It is on this account, probably, that Tibbat is not mentioned in such trustworthy books as the “*Mu‘ajjamu-l-baladān*,” the “*Jām-i-Gītī*,” the “*Mulḥaqāt-i-Ṣūrah*,” and others, the authors of which have not described Tibbat as other countries have been described therein, and have contented themselves with a brief summary respecting it, but from which, what Tibbat really is, is not to be gathered in the least. For this reason, I have the boldness here to endeavour to show and set forth what the territories included in Tibbat really consist of, and to furnish other information respecting it which is not obtainable from books.

“The region called Tibbat is a vast tract of country in length between north and west (N. W.), and south and east (S. E.), eight months’ journey, but the breadth of which does not exceed a month’s journey, and not less than ten days’ journey.² The north-west boundary adjoins Bilaur, the position of which has been previously given; and on the south-east Tibbat extends to Khōjū and Sālār, which are among the dependencies of Kanjān Qū-i of Khītā, as has been already detailed in the account which I have given of the mountain ranges of Mughalistān and Kāshghar;³ for the principal mountain range of

¹ But in these days, the “new woman” finds her way all about this, as well as other out-of-the-way countries, not liking ‘home.’

² The Tibbatī writers consider all Tibbat to constitute what is known to the ancient writers as “*Jambu Dwīpa* ;” and that to the east and north-east of Tibbat Proper, that is, “U” and “Thsang,” lies in the country of Great Tibbat. “Central Tibbat” they called “*Dvus*,” the first and last letters of which in italics, according to the Tibbatī mode of writing, are not pronounced.

³ In the same way as with regard to Tibbat, people will, down to almost the most recent traveller, persist in calling this place and its territory “*Kashgar*,” which, of course, is incorrect. We can from this imagine how other names must be vitiated by them.

Mughalīstān,¹ the whole of which branches out in different directions, passes north of Kāshghar, bends down to the west of that territory, and then bending southwards again, passes south of Kāshghar. The territory of Farghānah also lies to the westward of Kāshghar, and this very range here referred to lies between them. Thus the portion lying between Kāshghar and Farghānah is called Ālāe. Badakhshān lies to the west of Yār-kand, and there likewise the range in question lies between; and this last portion of it, lying between Yār-kand and Badakhshān is called the Pā-mīr,² which, in some places, is seven or eight days' journey in breadth. After it passes beyond this [southwards], there are some of the mountain skirts [hill tracts] of Yār-kand, which adjoin Bilaur, such as Rās-kām and Tāgh-i-Dūm Bāsh. When it has passed beyond this again, then comes the region of Tibbat. Badakhshān lies on the summer west [*i.e.*, the direction in which the sun sets in the height of summer] of Yār-kand, as previously mentioned, and Kashmīr lies on the winter west of Yār-kand; and the very same range of mountains runs between them. That portion of it which lies between Yār-kand and Kashmīr, is that part of the region of Tibbat which is known as Bāltī.³ In the same manner as this range is very broad from the Ālāe Pā-Mīr, in Bāltī it is still more so, being twenty days' journey in breadth. For example, the pass ascending into it on the side of Yār-kand is the 'Uqbah, or Pass, of Sānjū, and that for descending from it towards Kashmīr is the 'Uqbah, or Pass, of Skārdū or Iskārdū, and between these two Passes the distance is twenty days' journey. In the same way, on the winter west of Khutan some of the districts and provinces of Hind lie, such as Lāhōr, Sultān-pūr, and Māci-Wārah; and that same range of mountains previously mentioned lies between. That portion which lies between Khutan, and the before-mentioned places [*i.e.*, between Khutan and Hind] belongs to the country of Tibbat, such as Ardūk, Kōkah, and Asbatī.

“In the same manner, it is necessary to understand, that west and south of the great range which I have previously mentioned as termi-

¹ Which the Chinese style Thian-Shān.

² In one of his recent letters—the last I think—to *The Times* on “The Pamir Question,” M. Vambéry says: “I must begin by alluding to the rather curious fact that the name Pamir, as a geographical denomination, is utterly unknown in Turkestan. It does not occur in any of the historical records extant.” Here is a proof of it, as may be found in many “records extant;” but no such term applied to it as “Bām-i-Dunya (roof of the world)” can be shown in any oriental record whatever: the term is a purely European invention.

See my *Notes on Afghānistān*, etc., page 295–307, for what Bilaur consists of, and where it lies.

³ In another place he says Bāltī is a territory lying between Bilaur and Tibbat.

nating on the south-east as far as Khojū and Sālār, dependencies of Qāmjū and Sukjū-i of Khiṭā,¹ is Hindūstān; and that from Bahrah and Lāhor to Bangālah, the whole lie on the southern skirts of this great mountain range. All the rivers of Hind flow out of it; and the whole of the region of Tibbat follows, and is conformable with, the courses of all those rivers [on those sides]. To the north and east of Tibbat are Yār-kand, Khutan, Jar-jān [“Chárchand” of A—K’s explorations and map], Lōb, Kanak, and the Sārīgh Ī-ghūr, and the rest is sandy desert, the boundary of which adjoins Qām-cū and Sukjū-i of Khiṭā.

The rivers issuing from the mountains of Tibbat flowing towards the west and south, are all rivers of Hind, such as the Nil-Āb, the Āb-i-Bahrah [the Bihat or Jihlam], the Cin-āb, the Āb-i-Lāhōr [the Rāwī], the Āb-i-Sultān-pūr [the Bīah, which in the author’s day flowed close to Sultān-pūr], and the Āb-i-Bij-Wārah [the Sutlaj?], the combined volumes of which rivers signify, in other words, the Daryā-i-Sind [Indus]. On the other hand, the Jūn [or Yamūnā, *vul.* “Jamna,”], the Gang, and other rivers, all enter Bangālah, and unite with the ocean; and all that flow out of the mountains of Tibbat towards the east and north, such as the river of Yār-kand [Zar-Afshān],² the Āq-Qāsh, the Qarā-

¹ The Fanakatī says: “What the people themselves call Khān-zjū Khān-qūe, which the Mughals call Jāqūt, or Jah-qūt, and Hindūs call Cin, and we people of Māwarā-un-Nahr call Khiṭā or Khiṭāe.” See *Ṭabaqāt-i-Nāṣirī*, page 912.

² In the article on the “Pevtsof Expedition,” in the *Geographical Journal*, for July, 1893, we learn with respect to the “Yarkand-daria,” that the Russian spies were unable to carry their observations farther south than “Ish-debeh”:—“Unfortunately no contemporaneous observations were made, and therefore no positive conclusions could be formed. The Yarkand-daria is the chief river of Eastern Turkestan; its course is upwards of 1,300 miles long, and the determination of its sources is an interesting geographical problem,” page 62.

As to this “problem,” Mīrzā Ḥaidar says, in another part of his work, that “The water of the river of Yār-kand is the best of the waters of the world (in purity), and all the praises which physicians and sages have bestowed upon it are true and just. At the distance of one month’s journey it issues from the mountains of Tibbat, and originates from the melting of snow and ice [from a glacier?], and flows from south towards the north over rocks and sand, and with great swiftness. When it reaches Sārīq Kōl, which is the name of a well known territory of Kāshghar, its rapidity increases, and it dashes, and is dashed, against rocks and stones, and flows towards the east for a distance of seven days’ journey, until it reaches more level, open ground, and then flows for a distance of two days’ journey more in a stony, rocky bed, with great rapidity, until it reaches Yār-kand,” etc., etc.

According to the Survey Report, written nearly a century since, repeatedly quoted by me in my *Notes on Afghānistān*, “the interesting geographical problem” was then solved. It states, that after leaving the pass over the Qarā-Quram range towards Yār-kand, instead of keeping towards the north towards the

Qāsh, the Āb-i-Kirīah [“Kiria” of A—K’s explorations], and Āb-i-Jar-jān,¹ all empty themselves into the Lōb Nāwar [or Lōb Lake, which geographers will persist in calling *Lob-nor*²], which Lōb Nāwar is a great lake in the vast sandy desert tract which has been previously referred to. From some Mughals who knew this lake, I heard that it takes three months to go round about it, and that from the lower part of it issues a great river which is known by the name of the Qarā Nūrān [Mūrān?] of *Khiṭāe*.

“From this description it will appear that Tibbat occupies a very elevated position, because the waters issuing from it, all fall down in every direction; and from whatever side a person desires to enter Tibbat, it is necessary to do so by ascending lofty passes which have no subsequent descent; and when you reach the summits the ground is comparatively level.³ In some of the passes there may be a little

Sānjū Pass, you keep more to the left, and in four stages reach Kahaplū-Aghzah (referring probably to the place of many spurs, or many mouths or exits, and ascents).

Leaving Kahaplū-Aghzā (the “Kapaloong” of some maps), another five stages take you to Cirāgh Shāh, (the “Chiraghsaldee” of some maps), another now desolate halting place; so called after some Sayyid, and by the way, meet with much water, and many grassy tracts. There are springs of water here in all directions; and the water from them having united, and having been joined by other small tributaries, flows towards the north, towards Yār-kand, and receives the name of Zar-Afshān.—“The Disperser or Scatterer of Gold.” It is after this that its velocity becomes so great.

The next stage onwards from Cirāgh Shāh leads over the Kūdū Dabān, or Dawān, or Pass (the “Yangee Dewan” of some maps, and Yangi Pass of others). Dabān or Dawān—‘b’ and ‘w’ being interchangeable is the Turkish for a pass. This pass is of great elevation, and here the territory of Tibbat-i-Kalān or Great Tibbat terminates.

¹ As Mīrzā Haidar makes a difference between the letters ‘j’ and ‘c’ when necessary, I have left his words as they are written. This place is A—K’s “Chār-chand,” but I prefer the Mīrzā’s mode of writing.

² *Nāwar* is the Turkī for a lake, not *Nōr*. Vast physical changes must have taken place since the Mīrzā wrote; for we are told, that, according to the statements of M. Bonvalot, “it may be said that Lōb-Nōr has no existence in name or in fact; that there only exists beds of reeds and sand dunes, and that the largest sheet of water is called the Kara Buran.”

The “Kara Buran” here mentioned, is Mīrzā Haidar’s great river, the Qarā Nūrān [Mūrān?].

³ Although Mīrzā Haidar does not expressly mention by name “the newly-discovered Altyn-tagħ mountains [the Āltān Tāgh, or Āltān range]” of Prejevalsky, and the discovery that “the northern barrier of the Tibetan plateau,” advanced “to the meridian of Lōb Nōr 3° farther to the north than had hitherto been supposed,” but from what he says here, the Mīrzā was perfectly cognizant that Tibbat extended thus far north, and that its northern barrier consisted of mountains—a cross

inclination downwards, but not much. On this account Tibbat is excessively cold, in such wise, that in most places, with the exception of barley and turnips, nothing else is cultivated. The barley, too, is such as is for the most part grown and ripened in the short space of forty days, if at first, the cold of a long winter does not prevent the seed coming up soon. In most places in Tibbat grass continues green for two months; and in some places therein, although the summer season is nominally forty days, it is after such a fashion, that, after midnight, the rivers and streams freeze; and throughout Tibbat the keenness of the air is so great, that no tree, indeed not even grass, attains any height: all is stunted in growth.

“The inhabitants of Tibbat are separated into two divisions. One is called *Bōl-Pā*, that is to say, dwellers in villages or hamlets, and the other *canbah*, that is *ṣaḥrā-nishīn* or nomads; and they pay obedience to one or other of the governments or provinces of Tibbat. These nomad people have some astonishing customs, such as are not followed by other races of people. The first is, that they devour flesh and all other food in a raw state, and have no custom of cooking whatever.¹ Secondly, in place of corn, they give their horses flesh; and thirdly, all their burdens, baggage, utensils, and the like, they put on the backs of sheep, each of which carries a load of about twelve legal *manns*.² The sheep have saddle bags, crupper, and breastplate, fitted and fastened on to them, and they load them with as much as they can possibly carry. They never take off these loads except out of necessity [from the beginning to the end of a journey]; and winter and summer the load is kept fastened upon their backs.

range—stretching from the Pā-mīr portion of the great range he has described, for several degrees farther eastwards, and passing Lōb Nāwar on the south. Indeed, the middle route from Yār-kand by *Khutan* to *Khīṭāe* in those days skirted the northern slopes of that very range; and the Cingiz *Khān* returning from the neighbourhood of Peshāwar by Bāmīān and Buqlān into Māwarā-nn-Nahr and Turkistān, moved against Tingqūt by this same route. See *Ṭabaqāt-i-Nāṣirī*, note to page 981.

The Fanakati, in his history, says, with reference to the excessive elevation of Tibbat and its mountains, that the following line of the poet, Firdausī, is applicable to them, for from them

“Of the fish [which supports the world] thou seest the belly, and of the moon the back.”

¹ Grueber also says: “The people of Barantola are very slovenly, for that neither men, nor women, wear shirts, or lie in beds, but sleep on the ground: That they eat their meat raw, and never wash their hands or faces,” etc.

² The *mann* is a small one, and varies, it is said, in Tibbat, from 2lbs. to 6lbs. Hamilton says, in his account of Bengal and its trade with Tibbat, that the load for a sheep is from 12 to 20 lbs.

“The mode of life of the Canbahs or nomads is after this manner. In winter they descend from the mountain parts before named towards the west and south, which is Hindūstān, and bring down with them Khiṭāe goods, and musk, and *tanah-kār* or *tanah-gār* [borax], *māh-farfīn* [purslain], *qūtās* [*yāk* tails], gold, and *shāl* [fabrics], which are Tibbatī goods and merchandize,¹ and carry on traffic with the Hindūs of the mountain skirts of Hindūstān. From thence these Canbahs purchase and take home with them goods and manufactures of Hindūstān, such as clothing [piece goods for clothing], sweets, rice, wheat, etc., with which they load their sheep, and in the spring set out on their return to Tibbat, there being forage obtainable then, and their sheep numerous. They proceed leisurely, allowing the sheep to graze by the way, without interruption, and without stoppage, and reach Tibbat in the summer. Then, collecting such produce of Tibbat as may be saleable in Khiṭāe, they load their sheep and convey these articles, along with the products of Hindūstān they had brought with them [over and above what they required for home use], and set out towards Khiṭāe, and spend the following winter therein. Having then disposed of their Hindī and Tibbatī goods, they again collect the products of Khiṭāe, and set out for Tibbat in the following spring, and again reach it in the summer. They then collect such products of Tibbat as they require, and with them and the Khiṭāe ladings, they descend as before into the lower hill tracts of Hindūstān; and there they receive the hire for the conveyance of goods into Khiṭāe; and the hire for what they carry from Hindūstān they receive in Khiṭāe. Thus they pass one winter in Hindūstān and the next one in Khiṭāe alternately. This is the custom followed by the whole of the Canbah. There are some of them who may have conveyed 10,000 sheep loads; and from the rate of twelve *manns* to each sheep, one can compute what is the extent of traffic, and what amount of goods they convey once a year from Hindūstān to Khiṭāe, and *vice versâ*. At all times these loads and burdens accompany them wherever they go, except in case of any affliction or misfortune befalling them; and thus the loads they place on their sheep in Khiṭāe they only remove when they reach Hindūstān, and in the same manner when they return from thence to Tibbat and Khiṭāe again. I have never heard of such customs among any other people, and in many places it would scarcely be believed.

“These Canbah or nomads are a numerous people: for example, one tribe among them, whom they style Dol-bah, will amount to above

¹ Père Regis says: “The chief commodities in which the inhabitants trade with neighbouring countries, are Musk, Rhubarb, Worm-seed, and Furs. The most excellent Rhubarb comes from hence.

50,000 families,¹ and like this tribe there are several others. The writer has made inquiry among the most trustworthy persons among them, respecting the number of these Canbahs or nomads, and their answer was, that they were unable to say, for that God alone knew the number of them.

“The dwellers in villages, or sedentary people, who are styled Bol-pā, are distributed among certain territories, such for example as Bālti, which is one of the territories of Tibbat, and that comprehends several other [smaller] territories or districts such as Pūrīk and Ḥābūlah, and Shīgā, and Skārdū or Iskārdū, and Ladāqs.² Each of these contain forts, stations, and villages (with their lands). Those parts of the region of Tibbat which I have myself seen, the greater number of which were either taken by force of arms, or were acquired possession of after some endeavours by voluntary surrender, are some parts of Bālti, Zan-skār, Mār-yol,³ Yūdaq, Kōkah, Lō, Pōrās, Rōngah, Mankāb, Zīrsū or Zersū, Kāngār, Nīsān or Naisān, Yam, Alā Lāe Lōng, Tōk-ō-Lābōk, Asbarak or Asabarak, the whole of which I have traversed. From Asbarak people proceed to Bangālah in twenty-four stages; and Ūrsāng lies east of Asbarak, and Bangālah lies south of it. Ūrsāng is the place to which throughout Khiṭāe and Tibbat, they turn to, to pray, and is the most sacred temple of those people. What the writer has heard concerning it, being impossible of verification by him, is consequently not recorded, and possibly most of it is untrue. In short, it is the seat of learning, and city of the monks of Khiṭāe and Tibbat.

IN EXPLANATION OF THE WONDERS OF, AND DIFFERENT PLACES IN, TIBBAT.

“Of this region of Tibbat which I have myself seen, the manners and customs of its people are after such a fashion, that, notwithstanding I much desire to give a full description of them, I find it impossible to do so. However, I will record some of the astonishing things which I have beheld, or which, time after time, have been verified in my presence, on account of their strangeness. Among these, one is the gold mines. In most places frequented by the Canbahs there are gold mines; indeed in most of the Tibbat territory there is gold. Among these are two wonderful mines. One is in what is called Āltūn-cī Tibbat by the

¹ The people called the white and black tent nomads in the Index to the revised sheets of A—K's explorations are, doubtless, the Canbahs here noticed.

² The Tibbatīs, in their writings, spell this word much the same as Mīrzā Ḥaidar — “Ladāg” and “Ladvāgs” (the last letter in italics not being sounded; and they call the fort thereof “Sles-mkhar.”

³ Mis-called, as usual, in the best maps even, “Marol,” and in some others “Malial.”

Mughals,¹ in which some of the branches of Dōl-bah Canbahs, or nomads, already noticed, work; but on account of the excessive coldness of the air they are not able to work more than forty days in each year. The shafts (adits) open on level ground, in such wise that a person can enter them; and the shafts are numerous, and most of them lead one into the other. It is affirmed that as many as three hundred families at a time continue at all times to dwell in these shafts or holes. The passage of some Mughals happened to lie that way, and being perceived by the Dōl-bah from a distance, when they drew near, these people crept into the shafts so that the Mughals could not find one of them. In these shafts, likewise, they do not burn any oil, only clarified fat of sheep, in which no tallow is contained. They bring the earth in sieves to the mouths of the shafts and wash it, and it is said that from one sieve-full of earth, as much as ten *miṣqāls* (each *miṣqāl* being about one dram and a half) are on an average produced. The same person digs out the earth, brings it out, and washes it himself; and in the course of a day can fill and wash twenty sieves-full. Although this matter has not been verified and tested by me, nevertheless, the statement agrees in every way with the reports current in Tibbat, and therefore it has been recorded here.

“Another territory is Kōkah, which contains some two hundred forts. Its length is three days’ journey; and there is gold to be found in every part of it. They dig out a certain quantity of earth and spread it out on the face of a cured hide, and pick out the gold therefrom which is in grains. Some of these grains are of the size of lentils, or peas; and it is said, that, sometimes, nuggets of the size of an egg and even of the size of a sheep’s liver, or even larger are found.² At

¹ Āltūn or Āltān is the Turkī for gold, but not “Altyng;” and Āltūn-cī Tibbat refers to the northern parts thereof, near the “recently discovered, Altyn mountains.”

² All the rivers issuing from these mountains bring down gold — the Indus, the Kunar, the Yār-kand river, as its name indicates, namely, Zar-Afshān — the Scatterer or Diffuser of gold — and several others.

Among the rarities despatched by the Cingiz or Great Khān to Sultān Muḥammad, the Khwārazm Shāh, was a larger nugget than this one by far. The author of the *Ṭabaqāt-i-Nāṣirī* states (page 966) that, “Among the rarities and presents sent to the Sultān was a nugget of pure gold, as big as a camel’s neck, which they had brought to him [the Cingiz Khān] from the mountain range of Tamghāj, so that it was necessary to convey that piece of gold upon a cart.”

The ruler of Tamghāj in the time of the Cingiz Khān was styled The Āltān Khān, *āltān* or *āltūn* in Turkish signifying gold. Tamghāj is described as the name of a territory of Turkistān, *i.e.*, the country inhabited by Turks, and the name generally applied to the Bādshāhs or sovereigns of Tibbat and Yughmā; and Tamghāj and Yughmā are said to have been “the names of cities giving names to countries also.”

the time that I, the writer of these pages, fixed a capitation tax upon the Kōkah Chiefs, they related, that, only a short time before, a labourer was excavating in a certain part, when the implement he was using became so firmly fixed in a place, that, with all his efforts, he was unable to withdraw it again. He removed the earth from around, and what does he behold but a large stone, and in the middle of it embedded was gold, and the spade firmly fixed therein. Leaving it just as it was, he went away and informed the Hākīm or Governor of the matter, when that functionary, and those then present with him, went in a body to the spot, and took hold of the mass, broke the stone, and one thousand five hundred *miṣqāls* of pure Tibbati gold were extracted from it, each *miṣqāl* of that part being a *miṣqāl* and a half of the usual weight!

“The gold of Kōkah which they extract from the earth is, indeed, so pure, that, however much it may be assayed and tested, the only loss that arises is the right of the fire [*i.e.*, what is lost by heating and melting]; and this fact is considered astonishing and wonderful by travellers and assayers, and probably nowhere else in the world can such a thing be pointed out.

“In most parts of Tibbat the goods and merchandize of *Khiṭā* and Hind are to be obtained in much the same proportion and quantity.

“Another of the wonders of Tibbat is what is called *dam-gīrī* [stoppage of the breath or suffocation from stagnation of the air, as it is described], and this malady prevails throughout the whole of Tibbat;¹

¹ The author of the Survey Record I have before referred to, in his account of the route from Paṣhat, where gold washing has been carried on for centuries (the “Pishut” of the maps) to Goslak (see my *Notes on Afghānistān*, etc., page 145), over the Calas Ghāshaey, or Pass, says: “The summit of this mountain range, which is named Kuṇḍ by the Afghāns and Tīraj Mīr by the Tājzīks of Qāshqār [Kāshghar and Qāshqār are totally distinct countries], and which always appears white from excessive snow, lies on the left hand. By the way are dense forests, among the trees of which are many descriptions of fruit-bearing trees, and much grass and herbage of various species; and as from the smell of the grass (or herbage) a person becomes stupified, people take an onion along with them in their hands, and immediately on their brain becoming affected they smell the onion and also eat it, and their brain recovers from the effect.”

From this it appears that the “onion mountains” are more than one range.

In another place the Surveyor says, that the Mīr Shāh Rizā, Bādshāh or Chief of Drūsh, a dependency of Qāshqār, or Citrāl, who was an enthusiastic geographer, told him likewise, that the range extends in an unbroken, conterminous chain from the tract of country inhabited by the Qirghiz nomads (immediately south and west of Kāshghar), as far as Hirāt, and that Hindū Kush is merely the name of one of the passes leading over it. This range is also called Sarōwar [the same word as occurs in “Lake Mansarowar,” of the maps], and the Afghāns style it Kuṇḍ, both of which words are of the same meaning, Sarōwar and Kuṇḍ being the Sanskrit for ‘lake,’ ‘pond,’ ‘pool,’ etc.

but where there are forts and villages there it prevails to a less degree. In all cases the symptoms are the same: the respiration is always affected or stopped, and a person's head burns in the same manner as if he had taken a heavy load upon it and had ran up a very high ascent with it; and on account of this burning sensation he cannot speak without much effort. Then sleep overpowers him, but as yet the eyes are scarcely closed in sleep—what from the difficulty of respiration and the burning sensation in the head, and pain in the lungs and chest—than he awakes again in great anguish and agitation; and this is the state into which people always fall when attacked with this malady. When it increases, delirium ensues, and the person begins to talk incoherently, and sometimes has not the power to utter a word. The face, hands, and feet swell; and when this change has come, the person dies between the morning and the early forenoon. It sometimes happens that a person attacked lingers in this state for some days; and if, during this time, death does not supervene, and the invalid reaches a fort or village, or other inhabited place, there is a chance of his life being saved, but if not, death is certain to happen.

“Strange to say, this malady does not attack the people of Tibbat,

In another place (*Notes*, page 309), on crossing the Qarā-Quram range from Kahaplū Aghzā, he says, that “on the way thither, you meet with a vast deal of snow, and much water, grass, and herbage. As the smell emanating from these grasses produces faintness and stupefaction, travellers take care to provide themselves with onions when they travel by this route. When a person becomes affected from the smell, and feels faintness coming over him, his companions give him an onion to eat, and also one to smell at, and this is said to be an effectual antidote.”

It is doubtful, however, whether it would have the same effect if the person *continued* in that part; for, of course, only the first symptoms of *dam-gīrī*, are here referred to.

The Buddhist pilgrims, Hwui Seng and Sung Yun, which latter is said to have been a native of Tibbat, who visited these parts in 518 A.D., in the translation of their travels by Beal from the Chinese (page 183), say: “After entering the *Th'sung Ling* (or Onion Mountains), step by step we crept up for four days, and then reached the highest point of the range. * * * * To the west of the 'Th'sung Ling mountains all the rivers flow to the westward. * * * * To the eastward of the capital of this country [Han-pan-to, Pan-to, or Khartchou], there is a rapid river (or a river, Mang-tsin, or a wide ford river) flowing to the north-east towards Sha-leh (Sand-curb, see note 2 page 88).” Here, of course, the Zar-Afshān, described by Mīrzā Haidar, is referred to, which is styled by the name of Mangshīn [Mang-tsīn] up to the present time.

What I particularly wish to draw attention to here is the coincidence of the range being called the “Onion Mountains” in 518 A.D., from which it is evident that onions have been used for at least some fourteen centuries as an antidote against an attack of *dam-gīrī* (see also page 84), and that the probability is, that the range got the name of *Th'sung Ling*, or Onion Mountains, from this use of onions.

who are unacquainted with it: strangers alone are liable to its attacks; and their physicians cannot account for this disease attacking strangers and non-dwellers in Tibbat,¹ neither do they or any one else know any remedy for it. The colder the air the more people are affected by it; and it not only attacks human beings, but every living creature [foreign to Tibbat?], and more particularly human beings and horses, as will be presently shown. When on one occasion it became necessary to make a rapid inroad of one day's journey, and we set out, on the following morning when I awoke, the horses with the force which accompanied me seemed very few. On making investigation I found that in that one night 2,000 horses had died; and of my own stud alone there were twenty-four spare horses which had been taken on, and out of them no less than twenty-three had died! This malady seems to affect horses even more than human beings; and save in Tibbat, I never heard anything like it happening any where else.

“The ‘*ulamā*, or ecclesiastics of Tibbat, are all, without exception, called by the general name of *Lāmah*,² but they are styled by different titles according to the degree and description of their learning. For example: in my time they styled an *Imām* and a *Mujtahid*, “*Tōngbah*” and “*Kajūwā*,” respectively.³ I used to converse a good deal with them by means of an interpreter; but, when the discourse became somewhat difficult and abstruse, the interpreter used to be unable to understand it perfectly, and incapable of interpreting it, consequently, the conversation on such occasions would remain incomplete and unfinished. But what I understood of the fundamental articles of their belief is this [the author here gives an account of the Buddhist doctrine which I need not insert here, but merely add what he afterwards mentions regarding the Buddha himself]. “The doctrine of *Shakā Mūnī* is the religious belief of all *Khiṭāe* and Tibbat. In the former country they style him *Shaqiyā Mūnī*, and in the latter, *Shaqā Tōbā* [or

¹ The Tibbatīs we may say, are born to it, and therefore are not affected like strangers by such a rarified atmosphere.

² Or *Lānbah*, both being correct.

³ An *Imām* is prelate or chief priest, a leader in religious matters, and *Mujtahid*, an expounder of the law, traditions, etc., and of the *Qur’ān*. It must not be supposed that the *Mīrzā* means that these Tibbatī words are translations of *Imām* and *Mujtahid*: he merely means that the Buddhist priests of high rank or degree are so styled. *Tōngbah* is probably what the Tibbatīs style “*Tsonkhapa*.”

According to the author of the *Ṭabaqāt-i-Nāṣirī* (see page 1106) however, “in the time of the Great *Qā’ān*, *Ūktāe*, son of the Cingiz *Khān*, *masjids* were founded in all the cities of *Tingit*, *Ṭamghāj*, and *Tibbat*, and the countries of *Cīn*; and all the forts and strongholds of the countries of the east were given in charge to a number of Musalmān Amīrs.”

Tōyā ?], but, in history, the name is written Shakā Mūnī. In some Histories he is accounted among the prophets of Hind, and some aver that he was a philosopher. * * * Shakā Mūnī declared that of the 124,000 apostles or prophets who were to follow him, the last would be named Jānksabah, who would be an orphan, without father or mother, and all the world would become converts to his faith; that he himself would impart the precepts of his religion, so that it might be transmitted from one generation to another by these prophets down to the period of Jānksabah's blessed appearance. He also declared that the countenance of this prophet would be in such and such wise; and he had given an image which every one should take care to preserve, because a being would be born of that likeness, and that, before all other people, they should believe on him. At this time, in all their idol-temples, the image or likeness which occupies the chief place, is the image of this expected Jānksabah, and all the likenesses which they make are with reference to him.¹

“Another of the territories or districts of Tibbat is Zōnkah, which is the most noted and esteemed in all Tibbat. In that part the *māh-farfīn* is produced.

“I saw there a mandate from a Bādshāh of Khiṭāe, written in the Khiṭā-i character, in one corner of which the purport thereof was written in the Tibbatī alphabet, and in another corner, a translation in the Persian language,² neatly written in the *naskh* character. It set forth that, ‘His Majesty sends his greeting unto all people, and says, that Shakā Mūnī, who founded the religion of idol-worship (*but parastī*), lived upwards of 3,000 years ago, and that he had delivered sayings of great wisdom and subtlety which was beyond the capacity of every one to comprehend, and that they might set their minds at rest on that matter.’ There are other remarks on the subject of repairing the idol-temples; but the chief object intended to be conveyed is the era of Shakā Mūnī. A year different from that of the *Hijrat*, with which I was not acquainted, is written therein; but, from appearances, I should imagine that the document is not much more than a century old, but God knows best. I had gone into Zōnkah in Rabī‘u-l-awwal (third month) of 940 H. (September, 1533 A.D.).³

¹ This is a somewhat remarkable statement, and shows that what is assumed to be, and which writers call, “the image of the sitting Buddha,” in the temples of Buddhist people, is no other than the likeness of the coming Buddha, Jānksabah, and which Shāqiyā Mūnī enjoined his followers to keep in their temples. The same, I think, may be said of the paintings supposed to be of Shāqiyā Mūnī.

² This shows the extensive use of the Persian language in Asia.

³ This would be the reign of Yng Tsong, the sixth emperor of the Ming

“In Kāshghar, as well as in Tibbat, the *Qūtās-i-Ṣaḥrāe* [or wild *yāk*] is found, which is a formidable animal and a dangerous.¹ When it gets at a person, whether it butts with its horns, and gores him, or whether it kicks out at him, or gets the person under it, it is the cause of that person’s destruction; or whether, not having time enough for this, it merely gives him a toss which sends him twenty *gaz* (ells) up into the air, he is hardly likely to live after falling from such a height. One *Qūtās* bull is sufficient load for twelve horses; and one person can in no wise lift its shoulder blade. I killed a *Qūtās* at the time of making a certain raid, and divided the flesh among seventy persons, and each one had sufficient flesh to last him for a period of four days. These animals are not found anywhere else save in the region of Tibbat.”

THE AUTHOR IS DESPATCHED ON AN EXPEDITION AGAINST THE INFIDELS
OF TIBBAT.

After expatiating on the advantages of holy warfare against infidels to the orthodox Musalmān, the author says: “I set out from Kāshghar on this expedition in *Zī Hījāh* (the last month) of the year 938 H. (the latter half of August, 1531 A.D.). As I have previously mentioned, the northern boundary of Tibbat, that is in other words, *Bāltī*, terminates at *Bilaur* and *Badakhshān*. On its winter eastern side is the

dynasty. Du Halde tells us that in the third year of his reign (1441 A.D.) he issued an edict prohibiting all persons from doing honours to *Confucius* in the temples of the idols.

In his sixth year (1444 A.D.) he marched an army against the Tartars [*Mughals* rather] on the other side of the great wall. He was, however, entirely defeated, and taken prisoner, and carried away into *Mughalistān*. He is the *Tiêng-thûn* of the *Lāmah* quoted below.

According to the statement of the *Lāmah*, “*Sum-pa Khan-po*,” whose life is given by *Bābū Çarat Candra Dās*, in *J. A. S. B.* for 1889, page 63, the third Ming emperor was called *Tai Ming* (*Yemglo*), who ascended the throne in 1402 A.D., but he does not give the year of his death, or that of other emperors: he merely gives the date of their successors’ ascending the throne. The fourth Ming emperor, *Huñshi*, according to the *Lāmah*, ascended the throne in 1424 A.D.

This *Tai Ming* is the same potentate who sent an embassy to *Sultān Shāh Rukh Mīrzā* in 816 H. (1413-14 A.D.), with a letter, who is called *Dāe Ming* by the historians of *Shāh Rukh*’s reign. The latter sent a return embassy with a long and interesting letter in reply to that of the Ming emperor.

¹ The *Amīr*, *Nāṣiru-d-dīn*, *Sabuk-Tigīn*, father of *Sultān Maḥmūd* of *Ghaznih*, was nick-named by his comrades the *Qarā Bujkum* or *Black Ghajz-gāo*, which words are respectively Turkish and old Persian for the wild *Yāk* of Tibbat and adjacent parts. Black here refers, not to colour, but ferocity, and such as *Mīrzā Haidar* describes above.

territory of Yār-kand, and to the west of it is Kash-mīr. I was accompanied by Sikandar Sultān [Sultān Sa'id Khān's son], while the Khān himself proposed to proceed by the route of Khutan into the Altūn-cī Tibbat, which is a *dōl-pah*, or, in other words a *dash*t (steppe).¹

"I set out towards the close of the month before mentioned, and on the 1st of Šafar (the second month of the following year, 939 H.), we reached Nūbrah, which is a territory dependent on Tibbat. A messenger was despatched into the whole of these parts to invite the people to embrace the Musalmān faith.² Most of them accepted the invitation with submission, with the exception of these black-faced ones of Nūbrah, who manifested a contumacious and rebellious spirit, and all betook themselves to their forts and strongholds. Bōrq-pā, who was the greatest of the chiefs among them, and whose fort was Hōndār, which is the principal stronghold of that part, shut himself up therein. I invested him there; and was occupied for some days in preparing the necessary materials for laying siege to it, such as *manjanīqs* (balistas), *tōrās* (mantelets), etcetera, and on the day fixed upon, moved towards it. Confusion and disorder, however, arose among the enemy, and they evacuated the fort and took to flight, pursued by the Musalmāns as far as it was possible to follow them, and not one of the tribe entertained a hope of escape. Bōrq-pā, with all the males having been killed, a *manār* of the heads of these contumacious rebels was raised, and a monument to the infidels of these parts towered upwards to the sky. Their territory was taken possession of, and troops occupied their forts; and from thence we entered the territory of Mār-yōl. Here there are two Hākims or rulers, one was Lat Jū Ghadān, and the other Mā Shīgūn; and both of them came and presented themselves, and submitted. At this time the sun changed from *Virgo* and entered the sign *Libra*; and in *Libra* throughout all Tibbat, the severity of the cold is so great as not to be equalled in any other part in this season of the year. Consultation was now held with the Amīrs along with me, as to what part of Tibbat was the best for us to make our *qishlāq*, or winter quarters,³ and where forage for the cattle and food for the men would

¹ From the context this refers to the table land of Tibbat, rather than to a *dash*t or steppe.

² In other words, they were called upon to "come in,"—something after the manner recently, and now being practised on the frontier of Afghānistān towards the purely Afghān tribes—and allow themselves to be "annexed" against their will, but their religion is not interfered with.

³ Any one who has been in the Afghān state, especially its northern part, ought to know the proper meaning of *qishlāq* or *qishlāgh* ('q' and 'gh' being permutable in the Turkī language), and most people who have been in those parts do know that it simply means a place or tract in which the nomad people take up their

be procurable. No one could give indication of any such place in Tibbat; and the general opinion was, that it was advisable to enter Kash-mīr, and take up our winter quarters there.¹ If we could subjugate it, well, otherwise, having passed the winter there, we could leave it when the spring came round. Having reinforced the troops left to hold the different places in Tibbat [this part of it], we left Mār-yōl and those tracts, and set out towards Kash-mīr. News now reached me that the Khān himself [Sultān Sa'id Khān, ruler of Kāshghar] had arrived in these parts (Tibbat), and that on the road he had been attacked with *dam-gīrī*, the malady peculiar to this infidel land; and that the Khān wished to see me as quickly as possible. I therefore left the forces along with me at the very place where the news reached me, and set out at once for the Khān's presence.

"I previously mentioned that the Khān had intended to advance into Tibbat towards the *dol-pah* or *dasht* by way of Khutan, having despatched me with a part of his forces towards Bālti. At the period in question the sun was in *Aries*. The Khān, however, passed a month in some of the summer stations, and also in the pasture lands of the mountains of Kāshghar, until, in the meanwhile, the season of *Sunbal* had come round [the sun had entered the constellation *Virgo*]. People in the habit of passing to and fro in these parts represented to the Khān, that the time had gone by, and that after this, all the waters of the rivers would be entirely frozen up, in such wise that no water would be procurable, and that a sufficient quantity of firewood was not to be obtained in that part enough to thaw a sufficient quantity to supply the wants of man and beast.² Further, that it was necessary to make the utmost endeavours to procure and lay in a sufficiency of the droppings of the wild *qūtās* or *yāk*, to be able, at least, to cook broth. On this account, to secure a supply, a number of the men of the force [with the Khān] remained behind on this route, on foot, for this purpose. The Khān did not wish to retire and thus spoil this holy warfare, and said that difficulties and hardships were to be expected,

winter quarters. But Lieut.-Col. T. H. Holdich, R. E., who was with the Afghān Boundary Commission, has made a discovery to the contrary; for in his "Report" of the 14th of March, 1887, to the Secretary of State for India, page 25, he assures us that "*kishlaks*" are "mud villages," from "time immemorial" perhaps. After this, what might *ilāq*, or *ilāgh* be, which signify in the same language, a place where nomads take up their summer quarters?

¹ We have been repeatedly informed by persons who wish to be considered authorities in these matters, that we need not have any fear, because there are no practicable routes leading into Kash-mīr through Tibbat, and that that country was never yet invaded from the north. Here is a proof of their incorrectness.

² Showing that such was the usual method of obtaining water at that season.

but the merit would be all the greater; and that it was necessary to follow Mīrzā Ḥaidar, referring to myself, and complete the work they had undertaken. The Khān therefore returned from Khutan, and followed the very same route into Bāltī which I had myself taken. On the road his health gave way from an attack of *dam-gīrī*. He was very ill, and would often lapse into insensibility. His physicians tried all their remedies without avail; and although advised to give up proceeding farther by his Amīrs, he would not consent. He was desirous of joining me, although he himself expected he should die on the way. He told them, saying: 'Take me onwards to the scene of operations while life remains; and when I am incapable of anything, then you may do as you consider best.' He repeatedly inquired about me, and prayed that he might last out until he had seen me. It was impossible for them to halt anywhere, notwithstanding the state the Khān was in, because of the excessive cold, and the absence of water and forage, besides which, the very act of delaying in any one place would be the cause of increase of the malady; and the only chance remaining was for him to be taken to a place where the effects of this *dam-gīrī* were by no means so great. The Amīrs accordingly had taken the Khān to such a place; and on that day I arrived in his camp. The Khān had come to himself again on that day, and was much pleased at seeing me, and thanked God that I had come; and he actually recovered a little, so that we were able to conduct him into Nūbrah. There a consultation was held, and each one gave his opinion; and I represented to the Khān that, with all my search and inquiries, I found there was no place in these parts of Tibbat where more than 1,000 men could find winter quarters, and such a small number were incapable of suppressing any outbreak or quelling any hostility if it arose, and that, with the exception of Kash-mīr, no one could point out any other befitting place in which to remain for the winter. On the way, however, were several passes, in consequence of which, the weak state of the Khān's condition would not possibly admit of his proceeding thither; that if the Khān consented to the arrangement, 1,000 men should be left in attendance on him, and he should return to Bāltī, where there was neither *dam-gīrī* to fear, nor passes to be crossed; while I, with the rest of the force, would proceed into Kash-mīr and there remain for the winter, and when spring should come round we could act as might be deemed advisable. The Khān approved of this; and as it was understood at the outset, that Tibbat was not a country into which a large force could be taken¹

¹ When Ūktāe Qā'ān undertook the final conquest of Khīṭāe, in Rabī'u-l-awwal, 627 H. (March, 1230 A.D.), he despatched a force of 20,000 men under his brother, Tūlī Khān, along with whom was the Juzbī, Tūqūlqū, to enter that territory by the

[supported], the number originally fixed was only 5,000 in all : 3,000 with the Khān, and 2,000 under my orders. Accordingly, the Khān now took 1,000 men along with him, and marched towards Bāltī ; while the remaining 4,000, with several Amīrs of the Khān, proceeded with me towards Kash-mīr.

“The Khān reached Bāltī at the end of *Libra* ; and of the chiefs of that part, Bahrām, the Jū [or Jū-ī], presented himself, and submitted to him, but the rest of the Jū-iān [plural of Jū or Jū-ī] of Bāltī, as is usual among such infidels, showed hostility and contumacy. With Bahrām, Jū, leading the way, the force with the Khān attacked Shigar, which is the seat of Government and chief place in all Bāltī, and which was taken on the first attack. The men were put to the sword, while the women and children, and plunder, were appropriated by the Khān’s soldiers. After that they did not refrain from attacking other approachable places in that mountain tract, but, where there were strong forts and difficult *darahs*, those they were unable to approach, and they were left alone in consequence.

“On account of the depth of the snow that winter, no news could be sent from Kash-mīr to the Khān, and therefore the contumacious infidels gave out such reports as suited them and their infernal purposes, [Then, as now, all who defend their homes and their liberty, in these parts, and refuse “to come in,” are all “rebels and freebooters,” and their designs “infernal”], so that the troops in Bāltī had become anxious and depressed ; until, at the close of winter, the swift messengers whom I sent from Kash-mīr to the Khān, to announce the conquest of that territory, turned their sorrow into joy. In the beginning of spring, the Khān, with his force, retired from Bāltī ; and the expedition into Nūbrah, which I had made preparations for undertaking in person, had been entrusted by the Khān to the great Amīr, the Kōkal-dāsh, whose name has been mentioned before in the affairs of Kāshghar. Through defective counsel, however, and want of unanimity and foresight among his forces, they had devastated all that tract in such a manner, that the whole of the people thereof had been roused to resistance. All that could do so had fled to the strong places, and only their families and feeble people, who could not be removed, were left behind. Abandoning them, they did not cease from plundering on the routes, and from sedition, and other improper acts. As it was not

southern route through Tibbat, and near the northern frontier of the empire of Mahā Cīn. * * * * Tūlī’s force was nearly perishing of famine, so that his men were actually reduced to the necessity of eating human flesh and dry grass, and his further progress was stopped until aid was sent him. See *Tabaqāt-i-Nāṣirī*, note, page 928.

advisable for them [the force under the *Kōkal-dāsh*] to continue in *Nūbrah* any longer, they had come to *Mār-yōl*. *Tā Shīgūn* [the chief of that part] not having presented himself, one fort belonging to him was captured, and he and its defenders killed; and they were occupying the place when I arrived from *Kash-mīr* to present myself to the *Khān*, as I shall now proceed to relate.

“Having set out from *Nūbrah*, with the additional troops sent along with me by the *Khān*, as before mentioned, and rejoined my own force which I had left in the neighbourhood of *Mār-yōl*, I advanced with all possible celerity towards *Kash-mīr*. On the way, all the chiefs of *Tibbat*, through whose districts we passed, submitted, and added their fighting men to the number of mine. Some of *Bālti Tibbat* lying in our way we made incursions into; and in the middle of *Scorpio*, in *Jamādiu-ṣ-ṣānī*, 939 H.¹ (February, 1533 A.D.), entered *Kash-mīr* by the *Zōjī Lah* or Pass [by the *Dirās* road. I need not give here what he says about *Kash-mīr* and the operations therein: they are matters of history which I hope to discuss hereafter]. At the end of *Shawwāl* (about the end of June, 1533 A.D.) we again set out from *Kash-mīr* on our return, by the same route as we had entered it, by *Lār*. On reaching the frontiers of *Tibbat*, most of the people of that part came and presented *pēsh-kash* [tribute], and their wealth, with the exception of those of *Karsah* [the “*Kartse*” of the maps], which is a territory or district dependent on *Tibbat*, consisting of a *darah* or valley narrower than the heart of a miser, and the sides were steep in proportion, so that, at midday even, the route through it was dark. The people thereof were very bold and audacious, as they conceived it would be impossible to get at them. We reached the entrance to it after the time of midday prayer; and during the night every one made his preparations, and waited for the next day to dawn. We attacked them, and they several times rolled down great stones upon the troops of *Islām*, who, however, scaled the towering heights, and at last gained the victory. As it was all mountain, the enemy could not easily escape, and consequently most of them were killed, and their families and their effects became the booty of the victors. This success produced a wonderful effect on other parts, the people of which could not offer us too much; and all the wealth of the *Pūrīk* district, or territory, dependent on *Tibbat*, was gathered in, and this I divided among the *Amīrs* and soldiery, after having selected a few of the best things for presentation to the *Khān*.”

¹ This would be in February, 1533 A.D., but the sun enters *Scorpio* in October; and the year 939 H. commenced on the 2nd of August, 1532 A.D. I think, therefore, the *Mīrzā* must mean *Rabī‘u-l-awwal* or *Rabī‘u-ṣ-ṣānī*, the third or fourth month, not the sixth month of the year as above.

THE KHĀN SETS OUT FOR YĀR-KAND, HAVING NOMINATED THE AUTHOR
TO PROCEED TOWARDS ŪRSĀNG, AND THE KHĀN'S DEATH.

“After my return from Kash-mir to the Khān's presence at Mār-yōl, he held counsel with all his Amīrs; and finding that he was unable to undertake the chief object of this expedition himself, that is to say, the destruction of the great idol-temple of Ūrsāng,¹ the place to which all the people of Khiṭāe turn towards in prayer [most sacred place], and which he considered it was his duty as a pious Musalmān to do, he determined to send me on that service. I was to take whomsoever I chose with me, and was to have entire control over every one. I determined to take my brother, ‘Abdu-l-lāh Mīrzā, and my paternal uncle's son, Maḥmūd Mīrzā, and Jānkah Mīrzā, who is mentioned in the account of Kāshghar; and of the common men I selected 2,000, and prepared for the expedition. Six days of Zī-Hijjah [the last month] were occupied in this, when the time came for bidding adieu to the Khān, who was going from Mār-yōl to Yār-kand. I accompanied him one stage on the way, when the time for separation came. He kept his looks fixed upon me as long as he could see me, as I did towards him as long as he was in sight, and then I turned away with tearful eyes, and heart burning with the fire of separation from one I was never again to behold. I heard from him four days after, that he, having passed beyond the Sāqirī ‘*Uqbah* or Pass,² intending to push on after the usual religious observances of the ‘Īd-i-Azhā [10th of the month above named]; and this was his last epistle to me. After having observed the ceremonies of that festival he had set out, being taken on with all possible celerity; and he had cleared the Mūz Ārt³ [Ice Defile Pass] when his condition changed for the worst, through the noxious air of that tract. From thence to the place where the malady of *dam-gīrī* ceases to affect one was eight days' journey [ordinary stages], and he wished to be taken on as quickly as possible. As the only hope of saving his life was to get him beyond its influence, they seated him on horseback, supporting him on either side, when an upright position is the worst possible one for a person suffering from this malady, and he ought to have been placed in a litter. They completed the eight stages in four days; and at the time of afternoon prayer, had reached a place within three *farsakhs* or leagues of where all danger from *dam-gīrī* ceases, when the good Khān breathed his last.” [Here Mīrzā Haidar pays a grateful tribute to his memory, and mourns

¹ He writes this name Ūrsang as well as Ūrsāng.

² See my *Notes*, page 314.

³ This word is not ‘*muz*,’ but *mūz*, the *u* being long.

the loss of him who had cherished him from his boyhood, whose brother-in-law he was, in whose service he had passed twenty-eight years, and from whom, up to the very last, he had received constant proofs of affection and confidence. His death took place on the 16th of Zī-Hijjah, 939 H. (7th July, 1533, old style), aged 47. He was descended from Caghātāe Khān, son of the Cingiz, or Great, Khān, and had reigned over Kāshghar and Yār-kand for twenty years independently. Bābar Bādshāh was his paternal uncle's son.]

“I passed the ‘Īd-i-Azhā at Mār-yōl, and then set out on my expedition against Ūrsāng. We proceeded twenty days’ journey, meeting with none of the infidels of Tibbat; for such as there were had dispersed and entered into their forts, which were of considerable strength, and in which they placed great confidence, and to capture which would have been a difficult matter, and the advantage to be gained thereby not equal to the trouble. So, leaving Iskandar Sultān, and my brother, ‘Abdu-l-lāh Mīrzā, and my cousin, Maḥmūd Mīrzā to follow, with the heavy baggage and materials, and the weak mules, we set out with the light-armed troops and the strongest horses, with all possible celerity. On the 1st of Ṣafar (second month), 940 H. (21st of August, 1533 A.D.) we reached a place called Bār-yāng, belonging to a numerous nomad people (*lit.* dwellers in tents) of Tibbat, whom we came upon and harried, so that we captured near upon 300,000 sheep, together with captives, horses, and other property, all of which became the booty of the soldiery. There we halted for some time to allow the cattle to graze in the pasture lands thereof, and to allow Iskandar Sultān, ‘Abdu-l-lāh Mīrzā, and Maḥmūd Mīrzā, to come up. As I had gone on in advance, they were following at leisure; and on the 1st of Muḥarram (first month) of the year 940 H. (22nd July, 1533 A.D.), they had moved against one of those forts which I previously referred to, named Kārdūn,¹ and having reduced its defenders to extremity, they applied for aid to one of the Rāes of Hindūstān, and had brought thither 3,000 Hindūs, dagger-men [*kaṭārah-dār*], infantry. Iskandar Sultān, and my brothers, with 200 of their men, moved to attack them, and with such haste, that only a few of that number kept up with them. My brother, ‘Abdu-l-lāh Mīrzā, was an intrepid youth, and previous to this had performed brave deeds in the force along with the late Khān in Bālti. Flushed therefrom, he did not wait for the troops

¹ Possibly “Kārdam” of Walker’s map in longitude 81° 8′, latitude 30° 27′, and about eighteen miles south-west of his “Rakas Kal Lake,” near the frontiers of Hindūstān and Nēpāl, but I think it is much farther south than the route taken by Mīrzā Ḥaidar. There is a place called Barkhal on some maps in about longitude 84° 50′, and latitude 35° 30′, but that again is too far north.

to come up, but foolishly threw himself upon the enemy, with only three men with him. The enemy surrounded them; and at this juncture, Maḥmūd Mīrzā, with four others came to his assistance, charged among the enemy, and rescued ‘Abdu-l-lāh Mīrzā. Not content with this, ‘Abdu-l-lāh [and the others] again faced about and charged their opponents; and he was again completely surrounded, when five heroes came up, and seeing them in this plight, they also charged the infidels; but before they could reach them, they had cut my brother, ‘Abdu-l-lāh, into pieces, in such wise that every bit of his body, armour, and clothes remained in the possession of those infidels.

“Having continued in the pasture grounds here [at Bār-yāng] until the cattle were refreshed and recruited, I sent back from this place all the booty that had been taken; and having carefully selected 900 men from my force, with these I set out for Ūrsāng. From Mār-yōl of Tibbat to this place is a distance of two months’ journey, and when within one month’s distance from it, we reached a point where there is a great *kōl* or lake,¹ the circumference of which is forty *farsangs* [leagues], and on the banks thereof there is a fort which they call Tōk [Thōk] of Labōk, or Labūk, and there we happened to pass the night. Alas, when we awoke the next morning, the whole of the horses were dead, with the exception of a very few which were half-dead and paralyzed or distorted! I had twenty-seven horses of my own along with me, and by morning, but one remained unaffected, two others were half-dead, and twenty-four were quite dead; and this was the effect of *dam-gīrī*, as before explained.

“When we started from that place that morning one-fifth of the troops only were mounted, and the rest had to march on foot. On the second day, a district or territory named Yam² was harried, and many captives were taken. The people thereof stated that from thence to Bangālah was a road of twenty-four days’ journey.³ At this time, of

¹ This lake seems to be the “Chargut Cho, or Lake” of the maps, the largest of several west and north-west of the Tingrī Nāwar, and from which Lhāsa is distant about two hundred and fifty miles towards the south-east. At the rate of about twenty-five miles a day, which would be the average for horsemen in this part, it would be just ten stages from Lhāsa, and about three hundred and sixty miles northwards of Dārjiling. We must, however, allow for the physical changes of nearly four centuries.

² This evidently is the name which occurs in that of the *Chō* or lake to the south-west of the “Chargut Cho.”

³ It was by this route probably that Malik Ikhtiyārū-d-dīn, Muḥammad, the *Khalj* Turk, son of Bakht-yārū-d-dīn, and conqueror of Bang-āl (Bengal) invaded Tibbat from his capital, Lakhanawaṭī, at the close of the year 610 H. (1205 A.D.), as related in the *Ṭabaqāt-i-Nāṣirī*, pages 560–568. After he had passed “the

the force along with me, the number of mounted men whose horses were strong enough to go on, amounted to ninety only; and with these I proceeded four days' journey onwards to Asbaraq, from which to Ūrsāng¹

great river, Bēg-matī [the Brahmā-putr?], which in volume, breadth and depth, was three times greater than the Gang, he pushed on for fifteen days, and, on the sixteenth, reached the open country of Tibbat."

The Cingiz Khān while wintering at and around Gībarī in the district to the north of Peshāwar, before hearing that all Tingqūt and Tamghāj was in a state of revolt, was desirous of entering India, and returning into Cīn by way of Lakhan-awātī and Kāmūd; but, on hearing of these formidable insurrections, he resolved to return by the way he came, by Buqlān, Bukhārā, and Samar-qand, where he passed the winter of 620-621 H. (1223-24 A.D.), and subsequently set out for the disturbed territories "by way of Lōb and the country of Tibbat," that is, along the skirt of the Āltān Tāgh referred to in p. 89 note 3.

¹ It will be noticed that the Mīrzā never mentions the name of any place called Lhāsa, and yet, without doubt, he refers to the great temple or series of temples at the place known to us by that name. But from the context here, and what the old Jesuit travellers have stated, Lhāsa was the name of the territory, and not of the temple, or place of residence of the Grand Lāmah. In the map to Prejevalsky's travels, in the "*Proceedings of the Royal Geographical Society*," for May, 1887, "*Utsang*" appears as the name of the territory or province in which what we call Lhāsa is situated. This may be a vitiated form of Ūrsāng, the name of the great temple according to the Mīrzā.

According to the Jesuit Grueber, however, Lhāsa was the name of the territory or province, and not the name of the capital and the residence of the Grand Lāmah, where the great temple is, which he says is called "*Butala*," and which "adjoined the city of Tonkir." From this it would seem that the names have been changed in comparatively modern times since the Mīrzā wrote; but "*Butala*" cannot be Ūrsāng, as the former temple was only built in 1644 A.D.

It is not impossible that the name Lhāsa may have been applied to the capital and great temple in the same manner that Sūrī-Nagar is called "the city of Kashmīr:" not meaning that the city ever was or is called Kashmīr, but, that it was and is "*the chief city of or belonging to the territory of Kashmīr*." In the same way, probably, Tōnkir was styled "The chief place or city of or belonging to Lhāsa," and from constant use that name has been applied exclusively to the city where the great temple is, and where the Grand Lāmah resides.

Grueber calls the whole country *Tangut* [Tingqūt of the Mughals and Turks], and says it is divided into several parts, of which Lhāsa, or Barantolo is the chief.

In the account of Anandah, son of Mangqlīn, son of Qubīlāe Qā'ān, in Tingqūt, the Tārīkh-i-Alfī states, that Tīmūr Qā'ān, another grandson of Qubīlāe, who succeeded him, confirmed Anandah, his cousin, in the government of that territory; and it is stated in that work, that "Tingqūt is an extensive territory on the west side of Kḥiṭāe, and Tingqūt, in the language of Kḥiṭāe, is called Hawāshī, that is, the *rūd khānah*, or river, on the west, because most of the cities of Tingqūt are situated on the banks of that river [the Hoang-Ho?]. The great cities of that territory, which used to be the capitals and seat of government of that part from time to time, are five [the names of which are given, but only two can be written with any certainty, the others having no vowel points; namely, Qanjānqū, which

only eight days' journey remained. As, however, the horses of the men still remaining with me were falling, it became absolutely necessary to return. There was no help for it: and after setting out on our return, in six days we rejoined those we had left at Yam,¹ and from thence continued our retreat. This took place on the 8th of Rabī'u-l-ākhir (fourth month: November); and at the end of Jamādiu-l-ākhir, we reached Tām-Lik, distant from Mār-yōl twenty days' journey, and again joined the men with the booty and plunder which had been previously sent back. At Tām-Lik, which is one of the great territories of Tibbat, the people of Kōkah, having come, said that they agreed to pay the *jazīah* [a capitation tax on infidels, or non-Musalmāns], and invited me to come thither and fix the same, such as their means would admit of. In consequence of this request, I proceeded towards Kōkah, and between it and Tām-Lik passed one night on the road [took him two days to go], and reached it. The people received me in the most hospitable manner; and I remained there three days, and fixed the *jazīah* on that

might possibly be meant for Kong-tsang-fū of the Chinese, and Ū-bālīk. The others are written in the original, *فحسوق*, *ازروى* or *اردوى*, and *حلجان*. There are twenty-four lesser cities, besides towns and villages without number, and most of the inhabitants are Musalmāns.

The authors of the *Tārīkh-i-Alfī*, in another place, quoting from some older works, state, that "Tingqūt is described as a mountainous country (also) called Ankasāe. The Mughals called the country, which contained cities, fortresses, and many buildings, Aqashīn or Qāshīn," the chief city, apparently, giving name to the country also. See also note ¹, page 88.

Tingqūt seems to be the Hya or Ning-hya of the Chinese, the capital of which is called Īrīqī or Īrqī in the Tingqūt language, and Īriqīā or Īrqīā by the Mughals. There is still a "Ning-hya-wei" close to the Great Wall.

Sum-pa Khan-po, the Lāmah, quoted elsewhere, states, that in 1205 A.D. "Chiŋgis [the Cingiz, or Great, Khān] entered Tibbat, and subjugated all its provinces with the exception of Mi-Nag." This invasion of Tingqūt, as the Mughals style it, took place in 603 H. (1206-7 A.D.). The Lāmah afterwards states that "Chiŋgis subjugated Mi-nag of Tibbat in 1225 A.D., after which he died." This agrees with the Mughal accounts, which state, that, in 622 H. (1224-25 A.D.), the Cingiz Khān entered Tingqūt or Qāshīn, Shīdarqū, the Tingrī Khān, the ruler, having assembled a vast army, intending to throw off the Mughal yoke. The cities of Qām-jīw, Kā-jū, Su-jū, Arūmī or Urūmī, were taken, and the city of Ningāi, evidently the Ning-hya of the Chinese, was invested. See *Tabaqāt-i-Nāṣirī*, page 1085.

It must not be forgotten that Tibbat and parts adjacent have been subject to some great earthquakes, which probably changed the face of the country in many parts, and the courses of rivers. There was a great earthquake in 1352 A.D., and another, a fearful one, in 1681 A.D.

¹ This name is written Nīm here—*نیم*. Before it was Yam—*یم*—and I believe the additional point, making it Nīm, is an error of the copyist.

place [*sic*] at 3,000 Tibbatī *miṣqāls* [of gold], which are one *miṣqāl* and a half of our weight, and returned again [to Tām-Lik].

“Having completed this arrangement, I set out on my return; and on the road disastrous news reached me of the breaking up and dispersion of the force originally sent with me, as will be presently explained. [Here reference is made to the acts of ‘Abdu-r-rashīd Sultān, the son and successor of the late Sultān, Sa‘īd Khān, over Kāshghar]. Rashīd Sultān, when he set to work to murder his kindred, and afflict and plunder them, despatched an agent into Tibbat, and entrusted him with several mandates bearing his seal. One was for his brother, Iskandar Sultān, who was along with me, saying: “I give up to thee the territory of Tibbat; and let Mīrzā Ḥaidar and Maḥmūd Mīrzā remain there.” To the rest of those composing the force, to every troop and standard, one of these missives was sent, to this effect: “Every man who after this continues to remain in Tibbat, and does not immediately on the receipt of this order, forthwith disband and set out towards Yār-kand, his wife, family, and effects will be sold in Qīrghīz¹ in exchange for horses.” As this order had been received when I was away at Kōkah, as already mentioned, and had become known throughout the force, and its meaning fully understood, the men composing it, considering my absence very fortunate, deserted, and set out with all haste towards Yār-kand. Only Iskandar Sultān and my cousin, Maḥmūd Mīrzā, with a few followers, remained. Two days after this catastrophe I arrived at the stage or halting place [Tām-Lik] from whence the troops had dispersed and gone off. Iskandar Sultān and my cousin, Maḥmūd, related what had happened, and advised that we should not move that day, but remain there over night, as some of those who had gone off had done so because they were help-

¹ In another part of his work the author mentions who the Qīrghīz are, and which information people in the present day, for the most part, are ignorant of. He says: “The Qīrghīz are a tribe of Mughals, a division of the Ūir-āts, of which latter race near upon 30,000 remained [in his day] within the limits of Turfān and Kāshghar. These Qīrghīz having manifested much hostility towards the princes of the other Mughals, they separated from them; and the latter people, having become Musalmāns, while the Qīrghīz continued infidels, the other Mughals, in consequence, expelled them altogether.” I have mentioned these facts, because we may be told hereafter that the Qīrghīz are a totally different race.

Mīrzā Muḥammad Ḥaidar calls the tract which these Qīrghīz inhabited in his day, Qīrghīz likewise, that is, *the country of the Qīrghīz*.

Ibn Hauqal mentions the country of Khirkhīz or Ghirghīz, and says: “The country of Tibbat is situated between Khirkhīz and the empire of Cīn. Cīn lies between the sea and the land of the Ghuzz (Turks) and Tibbat; but the other parts [some ?] of Tibbat were annexed to it.” See page 85.

less, and knew not what else to do, and that it was probable some of the staunch ones would rejoin us. I had along with me in this expedition some hundred veterans, champions, and leaders, who had served with me for years, and their fathers and grandfathers had also served, who had been with me in many conflicts, and whom I looked upon and trusted as equals and brothers, rather than as subordinates. They had been selected by me on many occasions for honourable posts, and on the part of whom hostility I considered wholly impossible; yet, even these deserted me in the night and fled. In the morning I found all had deserted me, but Jān Aḥmad, Atkah,¹ whom I regarded as my foster father, and one of my Qōkal-tāshis,² named Shāh Muḥammad, whom I implicitly trusted, but he came back again, bringing five menial servants with him. I was thus relieved of the fear of being left entirely alone; and altogether, that day, about fifty men assembled around me. From this halting place we now set out towards Mār-yōl. It was the beginning of the winter season, and the sun had entered *Capricorn*, and the cold was so intense as cannot be described. Out of this number with me, some forty either lost a hand, foot, ear, eye, or nose, from the frost; and with the endurance of these afflictions and tortures we succeeded in twenty-five days in reaching Mār-yōl again.

The Jū-iān of Mār-yōl, Tā Shīgūn, [and] Raltah Jighdān, who have been mentioned previously,³ hastened to present themselves and tender their services, notwithstanding, that previously, they had been treated with severity, plundered, and their people killed. I was rather suspicious at this, but, contrary to my expectations, they proceeded to perform various sorts of good service for us; and, to assure us, stated, that it was four hundred years that from father to son they had been subjects of our Bādshāhs, “we their subjects and servants, and they our protectors and nourishers;” that, “if at the time when [those Bādshāhs came] in pomp and grandeur, with a great number of followers, and they themselves through fear and apprehension had committed any transgression or misconduct, it had been visited with corresponding punishment, according to usage in such cases. If every one among the Jū-iān of Tibbat had at that time submitted and presented themselves, they had done so out of fear and terror, but that now they offered their services in all sincerity and truth, and from their hearts, not from the tip of the tongue.” The fort of Shīah or Shiyah, which is the

¹ Atkah really means a tutor or instructor, — a superior servant entrusted with the education of his master's son.

² This word Qōkal-tāsh or Qōkal-dāsh, for it is written both ways, appears equivalent to a subaltern, henchman, or armour-bearer.

³ Only one of these, Tā Shīgūn. See page 99.

chief place and seat of Government of the Mār-yōl territory, they gave up to us as an offering; and we entered it, and took up our quarters therein. In short, we there enjoyed comparative luxury and comfort after all our hardships and difficulties. While there also, several of the men of the army, who had remained behind in that part, rejoined us; and among them was the Maulānā, Darwēsh Muḥammad, of Qarā-Tāgh, one of the followers of the Makhdūm, the Khwājah, Muḥammad Yūsuf. The Maulānā was a good man, and was exceedingly well acquainted with the Tibbatī language; and he was on terms of friendship and intimacy with all the Jū-iān of Tibbat. One, a Hājī, from Kash-mīr, also joined me; and he will be often mentioned in this work. In this manner over sixty persons were now collected about me, but all the soldiery had deserted and gone off [with the few exceptions referred to]. The latter, from the severity of the climate, and the difficulty and affliction that befel them on the way towards Yār-kand, found it was almost impossible to proceed. Those who persevered in so doing lost all their property, and 150 men among the number died from the excessive cold, and the remainder, half dead, succeeded in reaching Yār-kand. Another body turned back, and reached Mār-yōl in a sorry plight. Again a body of about 500 men were got together, and we succeeded in collecting about 10,000 sheep, so that we were able to live in comfort again.

“When I returned from the Ūrsāng expedition, and before reaching Mār-yōl, I had, it will be remembered, despatched Jān Aḥmad, the Atkah, and Shāh Muḥammad, the Qōkal-tāsh, with presents and rarities, taken during the expedition, to Rashīd Sultān, to Yār-kand, and to remind him of certain previous agreements between us. * * * * When that winter had come to a close, Rashīd Sultān despatched Bēdkan, son of Jān Aḥmad, the Atkah, who is my Qōkal-tāsh, and associated along with him, Hasan, Diwānah, to make his apologies and express regret at what had happened out of inadvertency, and of which he was much ashamed; and therefore it was necessary to express his regret to that friend, meaning myself, at what had happened. Further, that the Maulānā, Qōdāsh, with 200 men, had been despatched to join me, and that my own servants who had reached his presence [with the presents], should return again without let or hindrance. He also sent me some horses and a few rarities. The receipt of this communication was satisfactory; and now great part of Tibbat acknowledged submission to us.

“Maulānā Qōdāsh arrived in due course, and along with him several trustworthy dependents of mine; and after the arrival of this party we moved towards the boundary of Tibbat which adjoins Kash-

mīr, and all Bāltī paid its assessed revenue in a satisfactory manner. Sōrū, which is one of the places belonging to Bāltī, is the strongest and most defensible in that country.¹ Maulānā Qōdāsh asked permission to go there and collect the revenue assessed upon it. I was not willing, as I know those infidels do not like that any one should see their *darahs* and strong places; and they had intimated that they would themselves come, and bring the revenue to me along with them, at the place where I then was, and therefore there was no necessity for sending any one to collect it. Fate, however, had decreed otherwise, and the Maulānā went; and the Sōrū people waylaid him in a narrow defile, and without giving him any chance of resistance, slew him and twenty-four other trustworthy persons besides. Although my force numbered near upon 700 men, yet, from want of discipline and training, and deficiency of weapons, to avenge them was impossible; and much chagrined at not being able to do so, we moved from Bāltī to Tibbat-i-Zang-As-skār² [Zang-Skār], which is the name of one of the territories of Tibbat. It had not as yet been entered on account of its altitude,³ and the difficulty of approaching it; and the time for collecting the assessed revenue was not yet arrived, when we appeared on the scene, to wait for the time, and in combination collect it. At this time a messenger came from one of the Jū-ī⁴ of Bāltī, Tungī Sukāb, by name, who had done good service for me on a former occasion, saying, that now the opportunity had come for making a raid upon the murderers of Maulānā Qōdāsh, and slaying the males in retribution for their murdering him and his party, and making their families captive.

“I had sent back some of the men composing my small force, whose strength had failed them, to Mār-yōl, so that I might be able to move quickly with the strong and robust. As an escort to these weak men, I had sent my cousin, Maḥmūd Mīrzā, and a small party, to conduct them one stage on the way back, as the route was dangerous, and, having conducted them through the dangerous part, to halt at that stage for the night. I told him to keep the horses of his party near him during the night on account of the danger of the locality; and a horse, while grazing near the place of his repose, came rather too close to his head. He struck the horse to make the animal move a little farther off, when it launched out at him, and gave him such a kick in the

¹ The altitude of Sōrū, in the *darah* of that name, is just 10,624 feet above the sea level, and has lofty mountains on all sides of it.

² Also written Zang-kār, and Zās-kār by more recent authors. See my *Notes* page 313.

³ Zang-As-skār stands much higher than Sōrū.

⁴ Jū or Jū-ī, plural Jū-iān, is the Tibbatī for a petty chief. Note to page 103.

forehead that it was beaten in to the extent of the size of the horse's hoof. The next day he came to me, and I examined the wound; and, according to the custom of the Mughal surgeons, I extracted the pieces of bone from the wound, and set to to cure him if I could. I sent word of this untoward accident to Tungī Sukāb, who sent a message in reply saying, that as it appeared there was now a difficulty in my coming, if I would despatch a few men, he having captured Sōrū, would send me a fifth of whatever booty might be taken. This message reached me at Khūrbā,¹ in the centre of Zang-As-skār, where I was then halted; and Sōt, where Tungī Sukāb dwelt, was five days' journey off. I accordingly despatched the Maulānā, Darwēsh Muḥammad, of Qarā Tāgh, who was on very friendly terms with the Jū-iāns of Tibbat, along with Nūr 'Alī, Dīwānah, who was one of the most trustworthy of my adherents, and who, when the troops deserted and went off towards Yār-kand, on the occasion previously referred to had returned to me again. These two I made leaders, and sent 70 men along with them; and they proceeded, and reached the place agreed upon where they were to meet Tungī Sukāb.

“Two months almost had now passed since my cousin Maḥmūd met with his mishap, and the wound had spread over his whole face. It was highly dangerous, on account of the severe cold, for him to remain in Zang-As-skār. Helpless, and not knowing what else to do, I sent him back to Mār-yōl, remaining in Zang-As-skār myself, intending, that, after Maḥmūd should have reached Mār-yōl safely, I would myself set out towards Sōrū and see whether the means of livelihood were attainable there or not. When Maḥmūd reached the place where the horse had kicked him, on his way to Mār-yōl, he remained there for the night; and in the morning, about the time of mounting to proceed onwards, he had unbound his head in order to apply a dressing to the wound, when the cold air affected his brain, and he became insensible. At the time of afternoon prayer a man came back to me in all haste; and I went off, and arrived at midnight, and Maḥmūd was still unconscious. * * * * He died the third day after that. * * * *

“At this time of sorrow and affliction, a man arrived, sent from the party despatched towards Sōrū, saying that Nūr 'Alī, Dīwānah, having combined with those sent with him, had seized the Maulānā, Darwēsh Muḥammad, of Qarā Tāgh, and had gone off to Bāghān, one of the Jū-iāns of one of the territories of Tibbat, whom the Maulānā, it was said, had, on some previous occasion, deceived or imposed upon, and had badly wounded the said Bāghān, and placed his life in danger.

¹ Possibly “Kursha” of the maps.

These tyrants had made over the Maulānā as a present to this infidel, and thereby having obtained permission of him to depart, they all went off to Yār-kand. That Tibbatī infidel killed the Maulānā by fastening up his mouth with a wooden skewer! The Sōrū affair, in consequence of this incident, had to be abandoned.

“I brought Maḥmūd’s corpse to Mār-yōl, and from thence sent it on to Kāshghar to be deposited in the sepulchre of our forefathers. This affair happened in the beginning of winter, in *Scorpio*, when the cold of Tibbat is so intense, that we proceeded to Mār-yōl; and during that winter, and up to the beginning of spring, we endured such hardships and misery as cannot be expressed. When spring came round, for the sake of the horses, I set out with 70 persons, for Ūtlūq, a place to which people go, and which is noted throughout Tibbat for the nourishing powers of its grass. There I employed my time in hunting the wild ass, and the wild *yāk*, and in due course returned to Mār-yōl again. When I set out for Ūtlūq, I had left Iskandar Sultān at Mār-yōl in charge of the rest of the men; and now that all had assembled in one place, and the horses had become fat and strong, the men, unable any longer to endure the miseries and privations of this service, all of a sudden separated and deserted, and went off to Yār-kand. Only 50 men out of the whole of them remained with us: all the rest had fled. At this juncture, Jān Aḥmad, the Atkah, whom two years before, on the way back from the Ūrsāng expedition, I had sent to Rashīd Sultān with presents, as before mentioned, arrived from Yār-kand, and brought me information, which plainly showed that it would not be well or safe for me to remain in Tibbat any longer. This was the reason why I remained in it so long; for if I had left it and gone off any where else, Rashīd Sultān would have been sure to have laid the fault on me; but now he had broken the most solemn promises and compacts, confirmed by the most binding oaths, and they were buried in oblivion; but the breaking of his oaths lay on his own shoulders. Immediately after the arrival of Jān Aḥmad, therefore, I prepared to set out towards Badakhshān.”

THE AUTHOR PROCEEDS INTO BADA^{KH}SHĀN.

“I have before mentioned that out of 700 persons along with me in Tibbat only 50 now remained, the rest having fled in the best manner they were able towards Yār-kand. I have likewise mentioned the difficulties and hardships met with on the routes in Tibbat, through want of forage for horses, the lack of firewood, the excessive coldness of the air, and the difficulty of communication. All these difficulties exist to that degree that, even the mildest nature would refuse to put

up with such; and besides all these, there is the impossibility of obtaining a sufficient quantity of food and clothing, and other necessaries, and particularly horse-shoes, which on such routes cannot be dispensed with. Consequently, what with the failing strength of the horses, and want of food for them, and other matters, it was found impossible to continue any longer in Tibbat. We could neither go to Kash-mīr, nor Kāshghar, nor Turfān, nor Hindūstān: all were impossible of attainment as being unsafe. The only part in which there was a hope of security, and a chance of being well received, was Badakhshān. No one [among us] had seen any practicable route leading from Tibbat into Badakhshān which did not enter Kāshghar [territory?]; but among those men who had deserted with the intention of going off to Yār-kand, and had come back to us again, one, named Jahān Shāh, had, on a previous occasion, related, that he had heard from the people dwelling in the Kōhistān of Yār-kand, who were talking together on the subject, that from a place called Taghā-nāq there was a route in this way and that way, which came out into the Pā-mīr of Badakhshān.¹ I had at this juncture made inquiry of Jahān Shāh about this route, and we now set out to follow this road which as yet we had not seen. Of the fifty men remaining with me, as I have before mentioned, several of them, on account of want of strength to accompany us, remained in Tibbat, and with twenty-seven in all I set out. What with the lack of the necessary equipment for such a journey, and want of strength in the cattle, the difficulties of the route, and the intense cold, although the sun was in the constellation of *Virgo* [month of August], the danger was considerable; for when we reached a place called Qarā Quram ['Place of the Fallen Black Rocks']² at the time of the setting of the sun, the river there, which is of considerable size, became completely frozen over, and everywhere, where the ice was broken to obtain

¹ I hope it will be noted here that, even three hundred and sixty-five years ago, the Pā-mīr, or a large portion of it, belonged to, and formed part of, the territory dependent on Badakhshān. Russians will probably have the assurance to state that the Pā-mīr, or any portion of it, never belonged to Badakhshān. Another portion of it was subject to the rulers of Kāshghar.

² This does not seem to be the Pass of that name incorrectly written and "popularly" called, the "*Karakoram*" Pass, but a place much more to the west, and so called for the same reason as the other—"The Place of Fallen Black Rocks." To go from Mār-yōl to the "Qarā-Quram" Pass would have taken the Mīrzā and his party some 200 miles farther eastwards than there was any necessity for, and the retracing of his steps westwards would have added a similar distance. Besides, it is mentioned, that on the third day after Iskandar Sultān separated from them at the point [Taghā-nāq], where this unexplored route into Badakhshān branched off from the Yār-kand road, they in three days reached the Rās-kām darah. See my *Notes*, page 307.

water, not a drop was to be procured. We used our utmost endeavours to obtain some up to the time of the prayer before going to sleep, but without success. The cattle, which during the whole day had passed through a tract subject to the *dam-gīrī* malady, were thus without water on reaching their halting place, and forage for them was as scarce as silver to collect; and the little barley that was given them, they did not eat through want of water. At this juncture, Jān Aḥmad, the Atkah, said that he remembered having once seen a spring hereabouts, and that it was necessary for us to go on about half a *farsakh* (league) farther to reach it. We did so, and he pointed out a place among the ice where it should be broken. This was done, and water was found, and the cattle were watered; but there was a mule with us, one of the strongest among all the animals, which got lock-jaw for want of water, and notwithstanding all its efforts to do so, it could not drink, and died. Consequently, the necessary things with which it used to be laden had to be abandoned.

“Having reached the point where this unexplored route leading into Badakhshān branched off [from that leading to Yār-kand], Iskandar Sultān requested me to give him permission to leave us, saying he ‘would go to Rashīd Sultān, and that perhaps out of brotherly feeling¹ and kindness, he might take pity on him, as he might now be probably satiated with the destruction he had already wrought upon his kindred.’ I tried all I could to dissuade him, and assured him that no favour was to be hoped for from such an one. The difficulties and hardships of the way, and the distressed condition we were in, combined with want of resolution, and the uncertainty, tended to render him desperate, and the road of reason was veiled from his mind’s eye. I nevertheless complied with his request and wishes, and despatched four men along with him. Five persons having thus separated from us out of twenty-seven, I proceeded on my way with the remaining twenty-two; but on account of their being without shoes, several of our horses broke down. The very same day that Iskandar left me, at the time of afternoon prayer, I had the good luck to kill a wild *yāk*; and we drew pieces of its hide over the hoofs of the broken down horses [in place of shoes], and carried away as much as we possibly could of its flesh. Of food, save some barley, merely sufficient for the horses for one or two days, none remained, therefore this *yāk* was quite a God-send for us. We loaded the horses with as much of its flesh as they could possibly bear—about enough for us all for four or five days—and even then three-fourths of the flesh remained, which we left as a feast for the crows and

¹ They were not brothers by the same mother. Rashīd Sultān’s mother was one of Sultān Sa’īd Khān’s other wives.

ravens of those parts, which doubtless, they banqueted upon to their hearts' content. In this way we continued to proceed by conjecture, and next day we killed another wild *yāk*, very much larger and finer than the previous one; and the following day it so happened that the Provider of Daily Bread furnished us with food in plenty.

"From the account given of this route by Jahān Shāh, I conjectured, that in six days more we might reach inhabited tracts; but on the third day after separating from Iskandar Sultān, at about breakfast time [between sun rise and noon—the early forenoon], we reached a place where several men were, some of whom, household by household, came forward to meet us with great cheerfulness and good will. We inquired of them about the route and our destination. They told us that the *darah* or valley we were then in was called Rās-kām,¹ and that from where we then were to the Pā-mīr was five days' journey. Having now reached the habitations of men, and such men as we here met with, we recovered from the hardships and troubles of years in the rest and ease we here obtained. The people took from us every horse whose strength had been exhausted, and exchanged with us, and replaced them with others very good and strong. Of food and drink they placed before us the best of every thing they possessed, and pressed us to partake. The men on beholding me would weep involuntarily, and in passing me would say, in their own idiom: "Thanks be to God, that of our sovereign's descendants of four hundred years, thou at least art left. We are thy sacrifice, and we dedicate ourselves to thee with our families, and people, and all we possess." At every place we reached, the whole of the people, with their families, used to accompany us, notwithstanding I forbade them to do so, and would willingly have excused them, but it was of no use, and for the space of seven days, they conducted us, with the utmost honour and kindness, and endearing expressions, to the Pā-mīr,² and they even wanted to

¹ The route taken by the Mīrzā led nearly due west into the Darah of Rās-kām, through which a considerable river flows, which, in about the parallel of 76° east longitude, turns towards the north, and unites with the river of Yār-kand. On the south side of this *darah* a range of high mountains separates the Rās-kām from the Kanjut Darah, which routes are described in that part of my *Notes on Afghānistān*, etc., which has not yet seen the light; but some information respecting these parts will be found at page 315 of that work.

This route taken by Mīrzā Haidar three hundred and sixty odd years ago, is that which, in the account of "the Pevtsof Expedition," given in the "*Geographical Journal*" for July 1893, page 62, is said to be absolutely unknown! I gave an account of it, from Mīrzā Haidar's description, thirteen years before, in 1880, in my *Notes* which see.

² See Note 2, page 87.

accompany us, with all their families and belongings, into Badakhshān. At last, I managed to dismiss these kind-hearted people, and proceeded onwards into Badakhshān, to Sulīmān Shāh Mīrzā, who is the son of Mīrzā Khān, who was my maternal aunt's son. He came forth to receive me, and did everything in his power to show me honour and respect; and I gave thanks unto God, that, after all these dangers, I had reached such a place of safety and security.

“At the time that I reached Akhāwān, which is the *sar-ḥadd*,¹ or boundary of Badakhshān² [on that side], a man in the service of Rashīd Sultān who was there on some affair, presented himself before me; and I gave him a letter in Turkī to deliver to Rashīd Sultān, on the subject of his recreant conduct and unfaithfulness. * * * * He, soon after, had the kindness to expel from his territory my wife, who was the mother's sister of Rashīd Sultān himself, and sent Iskandar Sultān before mentioned, along with her. Another great favour on Rashīd's part was, that he did not plunder her of all she was possessed of, as he had treated others of his kindred. They, in much anxiety of mind, and in very distressed circumstances, along with some others, about ten in all, arrived in Badakhshān.”³ * * * *

That winter was passed by Muḥammad Ḥaidar Mīrzā in Badakhshān in comparative comfort, and, in the spring, in the hills and plains thereof; and in the summer he came to Kābul. There many others of the family of the late Sultān Sa'id Khān, expelled from the Kāshghar territory by Rashīd Sultān, also arrived. Subsequently Muḥammad Ḥaidar Mīrzā set out for Hindūstān; and when he reached Lāhōr, Kāmrān Mīrzā [son of Bābar Bādshah] was then there, who received him with honour and great kindness. He says, that about this time, Sām Mīrzā, son of Shāh Ismā'il, Ṣafawī, and brother of Shāh Thamāsib, the then ruler of Īrān Zamīn, tried to take Qandahār from Kāmrān Mīrzā. This event happened in 941 H. (1538 A.D.), but, after invest-

¹ This word incorrectly written, “*Sarhad*,” has been mistaken for the proper name of a place, and still appears in our maps as such, and also as “*Sarhad Wakhan*.” The Wākhān district terminates here, as the words *Sar-ḥadd-i-Wākhān* mean; and this place is not more than eighteen or twenty miles from the Palpī Sang Pass.

² Because Wākhān has always been part of the Badakhshān territory.

³ Mīrzā Muḥammad Ḥaidar forgave ‘Abdu-r-rashīd Sultān—for ‘Abdu-r-rashīd is his correct or full name—for his ill-treatment of himself and friends, as he had been led to commit most of his misdeeds by one of his Amīrs, Muḥammadī by name, of the Burlās tribe of Mughals, whom he subsequently rid himself of, and repented of his misdeeds. When Mīrzā Muḥammad Ḥaidar wrote his work in 953 H. (1546 A.D.), he named it after ‘Abdu-r-rashīd Sultān and styled it “*Tārīkh-i-Rashīdī*.”

ing it for eight months, Kāmṛān Mirzā arrived with an army from Lāhōr, defeated Sām Mirzā, and relieved the place.

I propose shortly to give the other valuable geographical details contained in Mirzā Muḥammad Ḥaidar's work, respecting Turkistān and Mughalistān, and other matters. In case any one hereafter should avail himself of any of the information contained in this paper, it is to be hoped that it will be acknowledged.

The following brief account of the western part of Tibbat is from the observations of the Mīr, 'Abdu-l-karīm, son of Mīr Ismā'il, of Bukhārā, who was there in 1224 H. (1809 A.D.). He had gone the preceding year, in company with the Mirzā, Muḥammad Yūsuf, from Bukhārā, on a mission to Constantinople by way of Moscow. From his account we can gain some idea of the state of western Tibbat about the same time that the Hon'ble Mount-Stuart Elphinstone was at Peshāwar on his mission to Shāh Shuja'u-l-mulk, the Sadōzī ruler of the Afghān State. 'Abdu-l-karīm states, that:—

“ There are seven Tibbats, three of which are subject to Kash-mīr, and the other four are independent, and have a Rājā, that is to say, a Ruler, of their own. The most of the people of the Tibbats are followers of the faith of the Qalmāq [Qal-ī-māq], Mānī, and some are *Majūs* [Magians]. Corn and provisions are scarce, and many of the people are very poor. Barley meal and flour of millet are obtainable. They give a daughter to ten husbands; and, if any one should take one of the people away and make a Musalmān of him, there is no hindrance. One Tibbat—Tibbat-i-Kalān [or Great Tibbat]—is parallel with Kash-mīr for fifteen stages. When a party of merchants make a purchase of *shāls*, they make up three or five parcels or packages into a bale or bundle, and as many bundles as there may be, they make over to the charge of Kash-mīrī porters hired for the purpose, who convey them on their shoulders, and reach Tibbat in fifteen days. As the route is difficult and mountainous, horses and mules cannot pass that way, and porters are hired upon all occasions. If a merchant so desires, he hires two men, who have small pads fastened to their shoulders; and he mounts the shoulders of one of them. The man takes hold of one foot of the merchant on one side, in front, and the other foot is towards the porter's back; and in this manner he goes along with ease and comfort. The other porter takes his turn to relieve the first, and in this manner they proceed on their way. * * * * Horses can go into Great Tibbat, and merchants avail themselves of them, and ride horses in going by that route.

“ When a *Kārwan* (vul. “caravan”) proceeds from Tibbat towards Yār-kand, which is a territory belonging to Kḥiṭāe, they have to pro-

ceed a distance of forty stages, through a part where there are neither inhabitants nor cultivation, and where neither firewood nor forage is procurable: only water can be obtained. It is a *kōhistān* (mountainous tract) black and arid, but one thing may be said in its favour, and that is, that highway robbers are not found in that part. People proceeding from Tibbat to Yār-kand, and *vice versâ*, take provisions for forty days along with them, such as bread, clarified butter, and flesh. In that mountainous solitude there are black crows, so that whenever a horse, through fatigue, lies down and falls asleep, these crows come upon the animal and peck out its eyes. There are also wolves, that, if they chance to find a man alone, they will attack and rend him. These crows, too, if they perceive a man through fatigue lying down, several of them collect about him and blind him, and after that devour him. The route is very rough and difficult, and besides this, an exhalation arises from the ground like unto the *samūm* [*vul.* "simoon"]. If a person should venture to move along somewhat quickly, this noxious vapour or exhalation, reaches his brain, and he becomes affected after the manner of people on board ship with sea-sickness. At times people die from its effects. Some apply garlic to the head, some smell it, sometimes lime-juice is taken, and the person affected recovers; but a great number of horses perish of that *samūm*.¹

"At times it so happens, that a merchant has ten loads of goods, and takes with him twenty horses by way of precaution, to convey the goods, and barley, bread, and other necessary stores. By chance, the whole of his horses perish on the road [from this malady?]. The merchant then places his loads piled one over the other, in an open place, and covers them with mats or felts, and marks the place with a heap of stones. If the merchant is going from Tibbat to Yār-kand when such an accident befalls him, he comes on, with the persons along with him, to Yār-kand, purchases fresh horses, and goes back and fetches his property. If, on the other hand, he is going from Yār-kand to Tibbat when he has the misfortune to lose his horses, he considers which place is the nearest to him, and he proceeds thither, and brings on horses to carry the loads. If he should remain away for years, his goods sustain neither loss nor injury.

"In that mountainous part, there are cattle which they style *qūṭās* (*yāk*), the tail of which is bushy like that of the fox, but very long, which they fasten to the head of their *tūghs*² or standards, which

¹ This, of course, is *dam-gīrī* already described by Mīrzā Haidar.

² The greater the number of *yāk* tails appended to the *tūgh* or standard, the greater the rank of the leader to whom it belonged. Thus we read in the old writers, in the wars between the Christians and the 'Uṣmānī Turks, about Pashās of so many

hang down like the hair of women. There are a number of these animals met with on this route; and in Tibbat they are domesticated in great numbers, and draw loads like as do buffaloes. The flesh and milk of these animals are very delicious. The writer of this, the humble Mir ‘Abdu-l-karīm, Bukhārī, proceeded twice into Kash-mīr; once, when in his sixteenth year, from Hirāt, by Qandahār, Kābul, Peshāwar, and Muzaffar-ābād, and returned by this very route through Tibbat. On the other occasion, he proceeded from the territory of Bukhārā [and] from Sīmī-pūlād [Semipolatsk], which is the termination of the Masqō¹ [Moscow—Russian] territory in that direction, and by Īlah, Āq-sū, Kāshghar, Yār-kand, and Tibbat, to Kash-mīr, in 1224 H. (1809 A.D.), and returned from thence by the same route. On the way through Tibbat a calf of the *qūtās* was found asleep, and I killed it with a pistol; and the flesh was delicious. Those who go into Tibbat to purchase the *tibbat*, that is the *pashm* [wool] of the goats, which *pashm* is used in the manufacture of *shāls* in Kash-mīr, bring back zedoary (*curcuma zedoaria*) from thence along with them.

“The particulars respecting Tibbat are, that it is a very mountainous tract of country, lying between the countries of *Khiṭā* and Hindūstān. It is very long in extent from west to east, but much less in breadth, while its elevation is so great that its mountains throw their heads to the sky, and its routes are as hard as the hearts of misers. It is three months’ journey [from the part of Tibbat referred to] to what they

tails; not that the *Pashās* were furnished with caudal appendages themselves, but their *tūghs* or standards.

In Rajab, 602 H., February, 1206 A.D., when the title of the Cingiz, or Great *Khān* was assigned to Timur-cī, at the *quriltāe*, or general assembly, held on that occasion, he set up a white *tūgh* or standard, consisting of nine degrees, or tails, indicated by as many tails of the *ghajz gaū* or *bos grunniens*; and he was seated on a high throne with a diadem on his head. Nine is the particularly venerated number among the *Mughals*, that being the number of the first nine chiefs of their *ī-māq* before the general massacre of the *Mughal* people by the *Tattār ī-māq*. See *Tabaqāt-i-Nāṣirī*, page 881.

¹ The author in mentioning *Rusīah* and *Rusīān* (Russians) says, in one place in his work, respecting the distance intervening between their territory and *Ūrganj* and *Bukhārā* at that time—just eighty-five years ago—that, “the difficulties by the way, the scarcity of water, firewood, and provisions, and the cold and snow of winter, and excessive heat of summer, are such, that the *Rusīān*, in consequence, have no desire or inclination in that direction [in which he, like many others, was much mistaken], the Almighty God, having, of His Mercy, placed thereby between the people of *Islām* and the *Yājūj*-like *Rusīān* [referring to *Yājūj Mājūj*—Gog and Magog], an Alexandrian barrier, otherwise those parts possessed neither the power nor the energy to withstand the armies of those infidels.”

At the period in question the Russians were otherwise engaged.

call Lāmbah [Lhasā?], where is the temple or place of worship of the people of Qalmāq [Qal-Ī-māq], and an assemblage of Brahmāns [! Buddhists he must mean]. Some relate that the *tābūt* [bier or coffin] of Mānī, the Naqqāsh,¹ is preserved there. This territory of Lāmbah is in the possession of the Bādshāh of *Khiṭā*; and in it dwell people who are nomads, and live in *khargāhs* [felt tents] in the open country and uncultivated tracts, who possess a vast number of sheep and goats. Their goats are of large size, and their *pashm* abundant, like unto the sheep of this country [the country where he wrote]. In the month of *tīr* [June], the shepherds dig up *zedoary* from the ground in the mountains and wilds; and rhubarb, and *māmirān* [a root yielding a yellow dye] are also brought from that part. There is a class of people, who having clubbed together, go out into the different mountain districts of this territory with their sheep, and from every here and there buy up the *tibbat* or *pashm* of the goats, from half a *huqqah* (a fardel or parcel) to ten *huqqahs*, and purchase the male goats also that the natives have to sell. Having put the *pashm* into saddle-bags, they fasten them on to their sheep; and in this way, in the course of two months, collecting *pashm* from different places, they manage to load a thousand sheep or more.”

¹ The name of a celebrated painter who lived in the time of Ārd-shīr, but some say, and more correctly so, in the time of Bahrām Shāh, ruler of Īrān Zamīn, and who appeared in the world after the time of our Saviour upon earth, and gave himself out to be an apostle, upon which Hurmūz Shāh, son of Bahrām, put him to death.

Another account is, that Mānī appeared in the world in the middle of the third century, and gave out that he was the paraclete or comforter promised by our Lord Jesus Christ, and soon founded a numerous sect. The ruler of Īrān Zamīn ordered him to be seized, upon which he fled into the country of the Turks (which includes Mughals and Tattārs). His religion was a mixture of Magian, Hindū, and Christian tenets; and among his followers were even Christian patriarchs and bishops. His sect were, from his name, known in Europe as Manicheans.

*Two copper-plate inscriptions of Kulastambha-dēva, an Eastern Cālukya King.—By BABU MAN MOHAN CHAKRAVARTI, M. A., B. L., Deputy Magistrate.*¹

[Read February 1891.]

These copper-plates were secured by me from the Rāghava Dāsa Maṭh in the Town of Purī, Orissa. They have been kept in the Maṭh as sanads of the Maṭh itself, but they do not appear to have any connection with it.

When I got them, the plates were very dirty, and the inscriptions hardly legible. I cleansed them by rubbing with tamarind and hot water, and then rubbed afresh with chalk. The letters can now be distinctly seen.

One plate is broader and more complete; it will be called A. The other plate is longer and will be called B. Plate A is $8\frac{3}{4}'' \times 6\frac{1}{2}'' \times \frac{1}{8}''$. It is covered with writing on both sides without any margin. On the front face are 22 lines; on the back 21. The letters are on an average $\frac{1}{4}'' \times \frac{1}{4}''$. Plate B is $9'' \times 5\frac{1}{8}'' \times \frac{1}{8}''$. Like plate A, it is closely written on both sides up to the edge, with 19 lines on the obverse side and 18 on the reverse. The letters are $\frac{3}{8}'' \times \frac{1}{4}''$.

From the middle of the top of both the plates rises a circular piece. The one in plate A contains on its face a half moon, below which is a boar (or a bull) sitting above a line, which with another line encloses the words श्रीमां कुलस्तम्भदेव (*Śrīmān Kulastambha-dēva*). Below the foot line are some letters not clearly traceable. The piece in B has a boar at the foot standing, above which are nearly the same words श्रीमां रलस्तम्भदेव. At the top is a half-moon. These circular pieces were evidently the seals of the granting king.

The letters look like the 10th century Kuṭila inscription given in Prinsep's work. The text purports to be in Sanskrit, but has

¹ [The publication of this and the following paper has been greatly delayed, owing to difficulties experienced by the author in securing an accurate copy of the extremely incorrect Sanskrit of the plates. The text is that given by the author, the plates not being available for comparison. ED.]

been badly transcribed. Orthography and grammar do not appear to have been much attended to. The context is not therefore clear everywhere. I have given a verbatim rendering without attempting revision.

The inscriptions generally agree till we come to the grant itself. They begin with an invocation to Çiva; then follow the praises of Kulastambha-dēva, born by a boon from the goddess Stambhēçvarī, and his son or governor (Kōdālō?) Kacba Dēva. Then come the grants. In B, the village Pajār in Ulōkhaṇḍ Sub-Division was bestowed on Bhaṭaputra Vēluka, a Brāhman. In A, the village Kāṇkanira in the same Sub-Division was bestowed on Bhāṭaputra Madhusōdana son of Bhaṭa Vēlu, probably the aforesaid Vēlu (-ka), a Brāhman of the Vaccha Gōtra, Yaçvāriçaya Pravara of the Yajurvēda. The grants are followed by the usual çlōkas of the Mahābhārata regarding the puṇya of land gifts and the sin of resuming them.

Kulastambha-dēva is mentioned as having been born in the Çūlkī Kula (lines 3-4), which cannot but be the Cālukya line. The possession of the plates by an Oṛissa Maṭh, the Telugite sort of name, Bhaṭa Vēlu (alias Vēluka), the word Kalinga (lines 21-22), coupled with the absence of any dates or any year of reign (so common in other dynasties) point to the Eastern Cālukya dynasty. The insignia of the boar on the seals are also worth noticing. The Eastern Cālukya dynasty ruled from about 610 A. D. to 1084 A. D., or for four centuries and a half (¹). The letters are certainly not later than the 11th century. Kulastambha-dēva must therefore be placed before the 11th century A. D.

Beyond this there are no certain data to go on. If Bhaṭa Vēlu be believed to be identical with Vēluka, a period of some 12 or 15 years might be supposed to have elapsed between the two grants—slight differences in the letters (such as न, र) corroborate this difference of time. Then Kulastambha-dēva could not have reigned less than 15 or 20 years. Is Kulastambha a surname of Guṇāṅka Vijayāditya III (²) who reigned 40 or 44 years, and who, according to Sir W. Elliott, conquered Kalinga? Guṇāṅka Vijayāditya III (Vijayāditya II of Elliott's list) began to reign in the middle of the ninth century, A. D., a date consistent with the old form of the Kuṭila characters in the inscriptions. Kulastambha-dēva might also be identified with Kulōttunga Ghōḍa-dēva, the celebrated monarch of the Cōlas, who flourished towards the close of the eleventh century A. D.

Through the kindness of the owner, I send one of the plates to the Society for comparison.

¹ Sewell's sketch of the Dynasties of S. India, pp. 13-15.

² Do., p. 12.

PLATE A.

OVERSE.

९ स्वस्ति जयति सुरासुरविद्वद्विद्य(त्) विरमकुट्टष्ट
 चरणाम्बुजशृङ्गिमणमयुखभाशितपिङ्गजटाभा
 रभासुरो गिरिशः स्तम्भेश्वरिलब्धवरप्रसादे श्रू
ल्लकीकुलेभू(त्)क्षितिप्रक्षाताराः श्रीमा (') कुलस्तम्भदेव प्र
 तीतः स्फुरन्नाता ययोदय तापितारी भास्वविचित्ररुचिरो
 ज्वल चारु शा (शो ?) भौरुचौ सदाशिवपुरोगम नियमागो ।
 दवालैयैर्निजयशोधरधवलै रणे नित्यमात्मनस्तदि
 व मुद्गमितोरुकिर्त्ती तस्यात्मजोभू(त्) जगदेकविरः ॥ ज
 यशो (शी ?) ल सत्खङ्गनिपातमिताः समन्ततो यान्ति रणे द्वि
 शन्तयो राजचकतिलकः सुगुणाङ्गि यातौद कामिमि
 मुख मनोहरकर्णपुरेः शङ्कोचिताहितवधूवदनार
 विन्दै देशान्चकार भिदुरै सुशुभौ शसिव तस्माद्वलो
 त्सारित वौ (वै) शिवारितः पग(? रा) क्रमाक्रान्त समस्तदिकूटः दान
 प्र(व)तार्दकर प्रतीतिमां दिग्वारनेन्द्रप्रतिमोभवसेतुः । कोदा
लो कच्छदेव द्विजगुरुचरणाराधनाशक्तचेता श्रीमां दुर्व्वारवौ (? वै)
 रिप्रवरकरिघटा कुम्भकुटाकवारः दातासत्त्वैकनिष्ठो जग
 त प्रीयुसम य पार्थिवेषु प्रतितः । (क ?) च्छेप्यमलान खङ्ग प्र
 कटभूजवला चासिताः श्रे(ष)शत्रु सकल गोन्द्रमौविधः प्रम
 माहेश्वरः समुद्गमिताशेष शट माह्वाराज श्री र (? कु) लस्तम्भ
 देवः शङ्खजोटावलयः पर (? री) क्रमतः य (त्) यन्मेमण्डलेस्मि(न्)
 भावीतः राजन्(नि?)करापुत्रा माह्वासामन्त नगरनानपि यथा का
 ल (? लि) ङ्गङ्गणे विष्णुपतिः निधिकारिणः (*) जनपद समादिस

(*) Plate B differs from this place as follows :—

रीण श्वस करुण कलय यथाद्रिं विधसतिः कुशल
 यथादिसति विदितमस्तु भवतां गो उलोखण्ड
 सम्बन्धः पजार ग्राम सयरि करतः सी देश स
 र्व्ववाधा विवर्जित चतुश्रय सिमा लय परीक
 रत पर्यन्तः । कर स्तरु ल १०(?) आविद्धा
 विनिर्गत भटपुत्र वेलुकस्य आ ण

PLATE A.

REVERSE.

ति विदितमस्तु भवता (') गो उला (? लो) खण्ड सम्बन्धः काङ्कनिर
 ग्राम सजलस्थलशयद्रारारान्यः चतुसिमाप्रयन्तः न केचीत
 वाधाकरणे क्रत्यः प्रतिपादितोस्माभीर्यतः भाटपुत्र व
 च्छपालकस्य दत्त ताम्रसासनः वच्छगोत्रः यश्चारिण
 यप्रवरः यजुर्वेदि वरणाः भाटपुत्र मधुसोदनः तस्य
 पिता भट वेलुः अतिधाविर्गतः सलिलधारापुरसरेन
 चन्द्रार्कसमकालमकरीकृत्य प्रतिपादिनः यस्ययस्य य
 दा भूमि तस्य तस्य तदा फलमाभूदफलशङ्का य प्रदत्ता
 नुपालनः स्वदत्ता प्रदत्तम्वा जो हरेत वसुंधराः सविष्ठा
 यां कृमि भूत्वाः पित्रुभी सह पचते शृष्टीवरिसहस्रा
 नि सर्गमोदेती भूमिदः अक्षेप्ता अत्रन्हन्या च द्वावव नर्कं ब्र
 जेतः हिर्नमेकं गवामेकं भूमिमेकर्द्धङ्गुलं हरन्वक् माया
 तियावताभूतिसंज्ञवः हरति हारयति भूमिं मन्दबुधित्त
 मावृत सवद्धो वारुणपासे तर्था (ग्) जोनिश्च गच्छति भुमो
 द प्रतिगेहनातिः तस्य भूमि प्रदलीण उभवतो पु
 न्यकर्मानिः मितो सर्गगामिनः इति कमलदला
 म्बुविन्दु लौले श्रीमनुचिन्त्य मनुष्य जि(वि)तं च सत
 र्कमिदमुदाहि (त) बुधा नहि पुरुषेषु किञ्च(र्त्ति) यो विलो
 प्याः लिखितमिदं पद कायस्थ माहासान्धिविग्रहि
 केन उ(त्)कीर्णश्च कासाराकुलपुत्रकनानय जाकेन
 उणाक्षरमधिता(? का) क्षराम्बा यदुपरिलिखित च + प्रम

TRANSLATION.

Om! Be it good! Blessed be the god Girīca whose lotus-feet are rubbed by the crowns of the most learned among the Dēvas and Asuras, and whose dark plaited hairs are illuminated by the rays of the moon-gem. By the grace of the boon got from the goddess Stambhēçvarī, appeared, in the Çülkī kula, king Kulastambha-dēva, celebrated (?) in the world, protector of the timid, whose rise (in the line) adorned by their various bright variegated auspicious tastes, and adhering (strictly) to the ways (of the Çāstras) laid down by the gods headed by Sadāçiva, puts the enemies to fear. In the wars whitened by (i. e., illuminated by) his fame-protecting bravery, great

renown is always gained by him, as if it is an attribute of his own. To him was born a son, a hero matchless in the world. Afraid of his ever-victorious good sword, the enemies fly on all sides in the battle; head of all kings, having subdued and extirpated the enemies by his forces (thus) beautifying the faces of his ladies with (golden) earrings won by this bravery, and rendering pale (with grief and fear) the lily faces of the ladies of the enemies, he pierced through their countries and shone like the moon. His power spreading on all sides, his palms appearing as if always wet by his numerous gifts, like the giant elephant watching in a cardinal point, he looks like a bridge over this world-ocean. Kōdālō (?) Kaccha-dēva is attentive in worshipping the feet of Gurus and Brāhmaṇas, is full of Ārī (grace), is a hero in piercing the necks of the big elephants of his difficultly subduable enemies. Liberal, powerful, on this earth and in the midst of kings he resembles Prthu. Though of the sea-coast, still the bright glittering sword of his arms terrified all sorts of foes....(Not intelligible 8 letters). The great devotee of Āiva whose enemies have all been subdued, Mahārāja Ārī Kulastambha-dēva surrounded by a round of Āṅkha-Jōṭaka (?) (thus proclaimeth):—In my Divisions, oh ye future princes, Mahāsāmantas (chief officers) of towns such as those in Kalinga, managers, treasurers and others! What is ordered, hear ye all! In the Ulōkhaṇḍ sub-division the village Kāṅkanira with (all rights of) land, water and forest, and (with all the lands within) its four boundaries, having taken it away from your jurisdiction, is thus granted by us—the copper-plate grant of Bhāṭaputra Vacchapālak, granted to Bhāṭaputra Madhusōdan son of Bhaṭa Vēlu of Vacchagōtra, Yaçvāriçaya Pravara, and of Yajurvēdi Varana, granted rent-free as long as the sun and moon with all rights of land and water. (Here follow ten lines quoting Mahābhārata about the efficacy of gifts and the sin of resumption.) Considering the riches and the life of man to be as fleeting as the water-drop on a lotus-leaf, and thinking over the aforesaid illustrations, persons ought not to take away the fame of others. This is written and inscribed by the Kāyastha Mahāsāndhi-vigrahika Kanānaya Jāka son in the Kāsārā Kula. Pray excuse any letter found wanting or written in excess in the above.

THE PART DIFFERING IN PLATE B.

TRANSLATION.

:—In Ulōkhaṇḍ sub-division the village Pajār with its rent settled, freed from all liabilities, with the four boundaries determined, with Karaba tree worth (or rent?) ten pals granted to Bhaṭaputra Vēluka. (Then come five lines from Mahābhārata.)

Two copper-plate inscriptions of the King Nṛsimha-dēva IV of Orissa.—By
BABU MAN MOHAN CHAKRAVARTI, M. A., B. L., *Deputy Magistrate.*¹

[Read February 1891.]

These two inscriptions have been found by me in Purī. One, I call, A, the other B. A was found in the Maṭh Tirmāli, a Maṭh opposite the northern gate of the Temple of Jagannāth. B was found in the Maṭh Ṣaṅkarānanda, about half a mile to the south of the Jagannāth temple and close to the old palace of the Purī Rājās. The present mahants of these Maṭhs are unable to explain how these plates came to their possession. On enquiry I find that the Maṭhs hold land near the villages granted in these inscriptions, and I presume the plates passed to their hands on the transfer of these lands.

The mediæval history of Orissa is dark. The Mādalā Pāñji or the chronicle of the Jagannāth Temple is almost the only source; but unless corroborated, its statements cannot be fully relied upon. The inscriptions now edited furnish valuable informations in the shape of the names of the kings, their years of reign, and their relationships. They refer to the kings of the second dynasty known as Gaṅga-vaṃśa.

A consists of seven copper-plates, nearly uniform in size ($1' - 1\frac{3}{4}'' \times 10'' \times \frac{1}{2}''$). B consisted of seven plates, but the 5th plate is missing ($1' - 1\frac{1}{4}'' \times 11'' \times \frac{1}{8}''$). All the thirteen plates have holes in the middle of the left side, through which a metal ring must have passed to keep the series together like a book. The rings are not forthcoming. The A plates are in a better state of preservation than B, the last plate of which is seriously damaged in three places.

With the exception of the first and last plates, the other plates of A and B are covered with writing on both sides, and contain 24 lines on each side. These lines occupy in A $1' - \frac{1}{2}'' \times 9''$, thus leaving a margin of $1\frac{3}{4}''$ by $1''$. Near the holes the lines are smaller—eight lines with $10'' \times 3''$. The B plates being larger, the lines are longer.

¹ [See note 1 on p. 123. ED.]

The letters are usually $\frac{1}{4}$ " by $\frac{1}{4}$ ". In B, they are not so good as in A, and are often not legible, having been effaced at some places, and at others having a black rust in the crevices, as hard as iron. The letters are Sanskrit and belong to an intermediate class between the present Devanāgarī characters and the 10th century Kuṭila characters.

The inscriptions consist of

- (1) The invocation.
- (2) The mythological introduction.
- (3) The genealogy of the kings and their praises.
- (4) The date of the grant, the name and boundaries of the village, and the name of the donee.
- (5) The conclusion.

Parts 1, 2, 3 and 5 are nearly the same in A and B; B containing the fuller inscription. Part 4 is naturally different in each.

The language is in verse, intermixed at one place in (2) with prose. Part 4 is entirely in prose and contains many Uriyā words. Mistakes in spelling occur every now and then; letters and even words are omitted; rules of grammar are often violated, and the versification is not always rhythmical. The composition has all the faults of mediæval Sanskrit poetry. The epithets are hyperbolical, the analogies and similes are remote and far-fetched, and the narration very prolix.

The inscription begins with a salutation to Īiva (omitted in B). Then follows a blessing by the god Viṣṇu. From the navel of Viṣṇu sprung Brahmā, who created Atri the father of Candrar or the moon. Several lines sing his praises, as this dynasty claims to have sprung from the moon. Then the poet exclaims,—“ who can sing the exploits of the moon-descended kings ” (A I, lines 14-15, B I, line 12). “ Therefore I write the names only of the first kings ” (A I, line 17, B I, line 14). Here follows a list of the mythological kings :—

Moon (चन्द्र).	Turvasu
Budha (बुध).	Gāṅgēya (गङ्गेय).
Anala (अनल).	Virōcana (विरोचन).
Purūravaḥ (पुरुवर).	Samvēdya (संवैद्य).
Vāyu (वायु).	Bhāsvāna (भास्वान).
Nahuṣa (नहुष).	Dattasēna (दत्तसेन).
Yayāti (ययाति).	Saumya (सौम्य).
Turvasu (तुर्वसु).	Açvadatta (अश्वदत्त).

Açvadatta	Jayasēna
Saurāṅga (सौरांग).	Vijayasēna (विजयसेन).
Citrāṅgada (चित्रांगद).	Vṛṣadhvaja (वृषध्वज).
Çiradhvaja (शिरध्वज).	Çakti (शक्ति).
Mēdhāvī (मेधावी).	Pragalbha (प्रगल्भ).
Parīkṣita (परीक्षित).	Kōlāhala (कोलाहल), or
|	Ananta Varmma (अनन्तवर्मा)
Jayasēna (जयसेन).	

A I lines 17—22, B I lines 14—19.

The mythological list ends with,—“In that line many more kings successively arose,” (A II. 1, B I. 22). So far about the Paurāṇik origin of the dynasty.

Then comes the strictly historical list. After mentioning that five Kāmārṇavas had preceded (A II. 6, B II. 1) it begins with,—“In that (moon-line) arose the king Kāmārṇava, founder of the dynasty.” (A II. 9, B II. 4). The inscriptions next go on giving the names of the successive kings, the names of their wives, the years of their reigns, all intermixed with profuse and hyperbolical epithets. The inscriptions thus enable us to map out nearly the entire period of Gangavamṇa dynasty, a period of more than 290 years. Seventeen kings are named, or from Cōḍagaṅga 14 kings. The following will show the details:—

1. Kāmārṇava (कामार्णव)
(A. II. 9, B II. 4).
|
2. Vajrahasta (वज्रहस्त) = Naṅgamā (नंगमा)
(A. II. 12, B. II. 6.) (A. II. 17, B. II. 10).
|
3. Rājarāja (राजराज) = Rājasundarī (राजसुन्दरी)
(A. II. 18, B. II. 11). (A. II. 20, B. II. 13).
|
4. Cōḍagaṅga (चोडगङ्ग).

Cōḍagaṅga is one of the most important names in Orissa history. According to the Mādalā Pāñji, he conquered Orissa and overthrew the Kēçarī or lion dynasty. This conquest is corroborated by the inscriptions which speak of his overpowering the Utkala king (A II. 35, B. II. 26). Cōḍagaṅga of the present inscriptions is evidently the same Cōḍagaṅga of Sewell's three copper plates, whose *abhiṣēka* took place in

saka 999 or 1078 A. D.¹ The names of the preceding three ancestors exactly agree in both.² Cōḍagaṅga married several wives and had several sons, who became kings of Orissa one after the other.

4. Cōḍagaṅga = Kasturikāmōdinī (कस्तुरिकामोदिनी)
(A. II. 21, B. II. 4) | (A. II. 47-8, B. II. 42).
reigned seventy years.

5. Kāmārṇava I. (कामार्णव)
(A. III. 1-2, B. II. 43-4)
reigned 10 years.

= Indirā (इन्दिरा)
(A. III. 16, B. III. 12).

6. Rāghava (राघव)
(A. III. 20, B. III. 15)
15 years.
= Candralēkhā (चन्द्रलेखा)
(A. III. 33, B. III. 26-7).

<p>7. Rāja-rāja I. (राजराज) (A. III. 34, B. III. 27) 25 years.</p>	<p>8. Anīyaṅga-bhīma (अनीयंगभीम)³ (A. III. 44, B. III. 41) 10 years.</p>
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The first three sons of Cōḍagaṅga apparently died childless. But from the time of Anīyaṅga-bhīma Dēva, the succession was lineal from father to son, without any break.

8. Anīyaṅga-bhīma-dēva = Bāghalla-dēvī (बाघल्ल-देवी)
(A. III. 44, B. III. 41) (A. IV. 6, B. III. 48).
10 years.

9. Rāja-rāja II. (राजराज) = Guṇa or Sadguṇa (गुण or सद्गुण-देवी)
(A. IV. 8, B. IV. 1-2) (A. IV. 12, B. IV. 10).
17 years.

¹ Sewell's Archæological Survey of S. India, Vol. II, pp. 33-4. For the readings of Mr. Sewell's copper-plates, see the Indian Antiquary, Vol. XVIII, pp. 161-176, certain verses of the present plates (A II. 12-17) slightly reversed, agree word for word with lines 77-84 (pp. 168-9) of Mr. Fleet's reading of the second inscription.

² Through his mother, Cōḍagaṅga was closely related to the Cōla royal family. His mother, Rājasundarī was the daughter of Rājendra Cōla (see I. Antiq. Vol. XVIII, p. 163, 28-9, p. 169, 85-6, and p. 174, 19-20).

³ Anīyaṅga-bhīma-dēva is also shortened to Anīyaṅga-bhīma in one passage A IV. 3, B III. 47.

10. Ananga-bhima (अनंगभौम) = Kastūrā (कस्तूरा)
 (A. IV. 13, B. IV. 11) (A. IV. 22, B. IV. 26).
 33 years.
11. Nṛ-simha-dēva I. (नृसिंह-देव) = Sitā (सीता)
 (A. IV. 24, B. IV. 27-8) (A. IV. 33, B. IV. 41)
 33 years. daughter of a Mālava king.
12. Vīra-bhānu-dēva I. (वीरभानु-देव) = Jākalla-dēvī (जाकल्ल-देवी)
 (A. IV. 33, B. IV. 14) (A. IV. 37, B. IV. 46).
 17 years.
13. Nara-simha-dēva II. = Cōḍa-dēvī (चोड-देवी)
 (नरसिंह-देव) (A. IV. 45, B. IV. 47).
 (A. IV. 41, B. IV. 47)
 34 years.
14. Vīra-bhānu-dēva II. (वीरभानु-देव) = Lakṣmī (लक्ष्मी)
 (A. V. 5), 24 years. (A. V. 10).
15. Nṛ-simha-dēva III. (नृसिंह-देव) = Kāmala-dēvī (कामल-देवी)
 (A. V. 12), 24 years. (A. V. 21-2).
16. Bhānu-dēva IV. (भानु-देव) = Hīrā-dēvī (हीरा-देवी)
 (A. V. 22), 26 years. of Cālukya Kula
 (A. V. 30-1).
17. Nara-simha-dēva IV. (नरसिंह-देव) (A. V. 33)
 in whose reign the grants were made, A in 8th aṅka (6th year),
 B. in 22nd aṅka (18th year)¹.

The value of these inscriptions is very much enhanced by the mention of dates. A furnishes two dates in the Çaka era; B two in Çaka era, and two without any era, but which can be calculated with the help of Prof. Jacobi's tables.

In A, the grant was made on Çaka-nṛpatēratītēṣu pañcādhikēṣu trayōdaça-çata-saṁvachcharēṣu ... Çrīmān Nṛsimha-dēva nṛpatēḥ svarājyasya aṣṭāṅkē abhilikhyamānē Caitrē māsi çuklē pakṣē trayō-dasyām (sic) tithau ravi-vārē, or on Sunday, 13th tithi of the bright half of Caitra in the year Çaka 1305 = 6th March 1384 A. D. (O. S.), which was a Sunday.

¹ For aṅkas, see my article on the Uriyā inscriptions of Jagannāth temple. J. A. S. B., Pt. I, Vol. LXII (1893), p. 89.

The aṅkas begin on the Suniyā day, which generally falls in the month of Bhādra being Simha çukla dvādaçī.

In B, the Grant was made on *Çaka-nṛpatēr atītēṣu ṣōḍaḍādhikēṣu trayōdaḍa-ḡata-saṁvatsarēṣu* *Nrasimha-dēva-nṛpatiḥ* (? *ēḥ*) *svarājyasya dvāvimṡatyankē abhiliḡhyamānē vichā ḡukla ēkādaḡyām maṅgalavārē* or on Tuesday 11th tithi of the bright half of the vichā month in the Çaka year 1316=23rd Nov. 1395 (O. S.) which happened to be a Tuesday. The Çaka year seems to be an expired year.

In A, Kāmārṇava II, the eldest son of Cōḍagaṅga, ascended the throne on *vēdartu-vyōma-candra-pramita-ḡaka-samāḥ* or 1064 Çaka=1142 A. D. In B, *vēdartu* is changed to *dēvartu* which would make the date of accession 1033 Saka or thirty-one years earlier. The later date is possible and more consistent with the date of Cōḍgaṅga's abhiṣēka as given in Sewell's plates (1078 A. D.) considering that he reigned seventy years. Furthermore according to Sewell's plates, Cōḍagaṅga was reigning in 1040 and 1057 Çaka—facts which cannot be explained if the earlier date (1033) be accepted¹.

Two other tithis are incidentally mentioned in the B plate No. VI.

1. At camp Dēvakūṡa on Wednesday the 7th tithi of the dark half, 2nd Vichā of 23rd aṅka=22nd Nov. 1396 A. D. (O. S.) (lines 25–6).
2. At camp Nārāyaṅapura on Saturday 11th tithi of the dark half, Mīna Saṅkrānti=24th February 1397 A. D. (O. S.) (lines 29–30).

With these dates and years of reign, the following table can now be constructed :—

Serial No.	Names of the kings of Orissa.	Years of reign.	Ref. to the plates.	Remarks.
1.	Cōḍagaṅga	70	A II. 45-6, B II. 40.	Began to reign in 1142 A. D.
2.	Kāmārṇava I.	10	A III. 15, B III. 11.	
3.	Rāghava	15	A III. 32, B III. 26.	
4.	Rāja-rāja I.	25	A III. 39-40, B III. 36.	
5.	Anīyaṅga-bhīma-dēva ...	10	A IV. 2, B III. 46.	
6.	Rāja-rāja II.	17	„ „ , B IV. 2.	
7.	Anaṅga-bhīma-dēva ...	33	A IV. 21, B IV. 25.	
8.	Nṛ-simha-dēva I.	33	A IV. 30, B IV. 36.	
9.	Vīra-bhānu-dēva I.	17	A IV. 43, „ „ „	
10.	Nara-simha-dēva II.	34	A V. 2, „ „ „	Was reigning in 1397 A. D.
11.	Vīra-bhānu-dēva II.	24	A V. 19, „ „ „	
12.	Nṛ-simha-dēva III.	24	A V. 25-6, „ „ „	
13.	Bhānu-dēva III.	26	A V. 37, „ „ „	
14.	Nṛ-simha-dēva IV. ... ..	...	... ..

¹ I would point out, however, that the total of reigns (268) plus six (the years as calculated from the aṅka in A), if added to 1064, amounts to 1338, and thus exceeds 1305 Çaka, the date given in the A. grant. There seem to be mistakes in the years of reign, otherwise this discrepancy is inexplicable. [Cf. also Prinsep's Useful Tables, Ed. Thomas, No. xxiv. Ed.]

Both the grants were made at Vārāṇasi Katak (Camp Vārāṇasi) or the present town of Cuttack. They were made in the presence of the following officers, respectively :—

In A.—

Door-examiner	...	Gaḍeçvar Jēnā.
Commander-in-Chief	...	Lāṇḍu-Sani Miçra.
Examiner of Accounts		Māhāpātra Narēndra-dēva Chakravartī.
Officer	...	Narahari Dāsa Praharāja (the donee).
„	...	Çrīpati Maṅgalarāja.
Writer of accounts	...	Svapnēçvara Mahāsēnāpati.
„	„	Baidī Mahā-sēnāpati.

In B.—

Officer	...	Mahāpātra Kṛṣṇānandya.
„	...	Do. Lāṇḍu Ratha.
„	...	Do. Gopīnātha.
„	...	Pātra Bhuvanānanda.
„	...	Siddhēçvara Jēnā.
Door-examiner	...	Trivikrama.
Writer of accounts	...	Viçvanātha Māhā-sēnāpati.

The subject matter of the B grant were subsequently considered and confirmed in the camps Dēvakūṭa and Nārāyaṇapura, where the following officers were present :—

At Dēvakūṭa :—

Priest	...	Pātra Māhā-muni.
Door-examiner	...	Trivikrama.
Commander-in-Chief	...	Sōmanātha Vāhinīpati.
Treasurer	...	Narahari.
Keeper of Accounts	...	Viçvanāth Māhāsēnāpati.

At Nārāyaṇapura :—

Commander-in-Chief	...	Somanātha Vāhinīpati.
Officer	...	Bhuvaneçvara.
„	...	Lakṣmaṇānanda.
Treasurer	...	Narahari
Door-keeper	...	Trivikrama.
Examiner of Accounts		Gatēçvara Dāsa Çrī-candana.

The villages were bestowed on the Brāhmaṇas for the increase of the king's life, health, prosperity and empire (*Svāyurārōgyaiçvarya-sāmrājya-samṛddhaye*). In A, the village Kimnari-grāma was bestowed on Mahāpātra Narahari Dāsa. This village was in the Uttarakhaṇḍa Kalabhō (Daṇḍapāt) and was worth 900 māḍhas of gold. At the time of the grant its name was changed to Vijaya-narasimhapura-çāsana (from the name of the king). As a part of the grant was the home-

stead land with a house, of a Brāhmaṇa named Svapnēçvara. He was of Kaunḍinya Gōtra and a reader of the Kanva Çākhā of the Yajur-vēda. His land was in area, four bātīs or 80 acres.

In describing the boundaries, several villages are named, two of which—Bhākharsāhi and Makuluṇḍā still exist within the Purī District. The approximate position of the villages Kimnari alias Vijayanarasimhapura, would be long. $86^{\circ} 5' 30''$ by lat. $20^{\circ} 22' 30''$.

In B, the villages, Sāisō and Rāḍaso-o were granted to a Brāhmaṇa named Dēvaratha Ācārya of Ātrēyasa gōtra and reader in the Kānva Çākhā of the Yajur-vēda. They appear to have been granted to him as the sēvak in the temple of Ugrēçvara-dēva. In area the lands were 30 bātīs, or 600 acres, and priced at 449 māḍhas. The boundary villages still exist, and with their help, the position of the villages may be approximately put at $85^{\circ} 56' 45''$ long. by $20^{\circ} 10' 27''$ lat., on the left side of the river Bhārgavī and close to the P. W. D. Bungalow at Khirkhiā. The villages were in Kōṣṭhadēsa (Daṇḍapāt), Ōḍamōlō (Subdivision), Maḍanakhaṇḍa Viṣaya (now *bisi*).

The inscriptions were inscribed by Durgādāsa and Gurudāsa Sēnāpati respectively. They close with the usual extracts from the Smṛtis as to the benefits of gifts, and the sins of resumption.

Before concluding, I would draw attention to two passages. The first passage is the one beginning with *pāḍau yasya dharāntarikṣa...*to...*prāpya pramōḍānvitā*. (A. II. 38-43, B. II. 28-33).

Translation:—“What king can be named that could erect such a temple to god Puruṣōttama—a temple, whose base is the whole earth, whose navel the entire sky, whose ears the cardinal points, whose eyes the sun and the moon, and whose head the heaven. Left undone by the first kings, Gaṅgēçvara built it. This ocean is the birth-place of Lakṣmī, not so thinking in his father-in-law's house (the ocean) Viṣṇu lodged; but because he got there full adoration. The god Puruṣōttama, still feeling apprehensive, was glad to get this new home; and Lakṣmī, too, gladly preferred living in her husband's new house to living in her father's home.

The temple raised by Gaṅgēçvara must have been a celebrated temple to deserve such specific notice in the inscription. Of Puruṣōttama, what temple can it be but the temple of Jagannāth? The inscription then differs from the Mādalā Pāñji which ascribes the erection of the temple to Anaṅga-bhīma-dēva, and which gives several specific details. Is this difference due to the fact that the main temple was built by Cōḍagaṅga, but that the side temples, the walls, &c., and the thorough systematisation of the ceremonies and sebās were made in the time of Anaṅga-bhīma-dēva, and that in course of time, the former circumstance was lost sight of and the temple passed as Anaṅga-bhīma's?

The second passage worth noticing is *Rājñō yasya Gayāsadīna*to...*sandhyānurāgachalāt* (A. V. 6-8).

Translation:—"The king's (Bhānudēva II's) war with *Ghayāṣu-d-dīn* beginning, the blood flowing from the necks of the many big chiefs wounded by his valour filled the world. The blood stream gushing up profusely from the then wounded breasts of the (enemy's) elephants was such that still shines in the sky in the disguise of sunset glow."

Ghayāṣu-d-dīn is evidently a Muhammadan name.—The war spoken of is thus probably the incursion of *Ulagh Khān*, in 1323, A. D., after his capture of Warangal. *Ziyāu-d-dīn Barnī* in his *Tārīkh Fīrōzshāhī* thus speaks:—

"The prince (*Ulagh Khān*) then marched towards *Jājnagar* and there took 40 elephants, with which he returned to *Tilang*."¹

Jājnagar was the name by which Orissa was known to the early Muhammadan historians.

Lastly, the grant portions (4) in both the inscriptions are, curiously enough, mostly in *Uriyā*. This is the earliest authentic writing in which *Uriyā* words have been found. The language shows that in words and syntax the old *Uriyā* of five hundred years ago, was nearly the same as now.

The inscriptions are too long, and the descriptions too verbose and hyperbolical to re-pay the labor of an English translation. The material portions have been noticed in this sketch.

Plate A, No. I.

ॐ नमः शिवाय ^२ । लक्ष्मीपादसरोरुहद्वयमदः श्रेयांसि दासीष्ट वः प्रस्फुर्ज
न्नखरश्मिकेशरशतं भास्वनखालीदलं । विस्पष्टं प्रतिविम्बितः प्रणमनैः क्रीडा
पराधोद्भवैः कृष्णो यन्नखदीप्तिषु भ्रमरतां धत्ते स लक्ष्मीप्रियः । क्षीरार्धमथितात्
सुरासुरगणैः प्रादुर्भवन्ती रमा शम्भुब्रह्मपुरन्दरप्रभृतिषु प्रख्यातकीर्त्तिष्वपि पश्य
न्यम्बुजनाभमीशमष्टगोल्लोकत्रयाङ्गादिनं भृङ्गाली सहकारमेति हि वने फुल्लान्य
शाखिन्यपि ॥ तन्नाभीसरसीरुहोद्भवविधेरत्रिर्बभूवामृतश्चन्द्रश्चन्द्रिकया प्रकाशित-

जग

त् संभूतवान् नेत्रयोः । त्रैलोक्यग्रसनैकदक्षतिमिरग्रासित्वसाम्येपि यो लक्ष्म्याजि

दधत्त

मः प्रतिवपुः सूर्याधिको निर्मलः ॥ श्रीदेवीसोदरत्वादमृतसखतया कल्पवृक्षानु
जत्वाल्लोकानन्दं विधाता तिमिरविषहरः सर्वदेवोपभोग्यः । तत्त

¹ Elliott's H. of M. India, Vol. III, p. 234.

^२ Omitted in B.

त्संसर्गलाभात्तदधिगतमलं स्वाङ्गनिष्ठं दधानः स्वस्यैतन्निर्मलत्वं
जगति विजयते दर्शयन्नूनमिन्दुः । वंशे तस्य नरेश्वराः समभव
न् येषां गुणा वन्दिताः प्रोत्फुल्ला इव तत्पुराणपथगास्तत्रापि नो स
म्मिताः । तत्तत्काव्यपथं श्रितास्त्रिभुवने मूर्तिं दधाना इव भ्राम्यन्ती
व सुवेतनाः श्रुति गृहे विश्रम्य विश्रम्य च ॥ प्रत्येकं शशिवंशभूपति-
भुजव्यापारसंकीर्तनं कर्तुं कः क्षमते क्षितौ वज्रमुखो यत्रार्जुनस्यै-
वहि । दोर्दण्डार्जितकीर्तिवर्णनकथा तद्भारतं प्राभवत्तस्मादाङ्ग-
यमात्रमाद्यन्तपतिश्रेणी क्रमास्त्रिख्यते ॥ ३ ॥ तथाहि चन्द्रः चन्द्रात् बुधः बुधादनलः

अनलात् पु

रुरवाः पुरुरवसो वायुः वायोः नज्जषः नज्जषात् ययातिः ययातेस्तुर्वसुः ततो
माङ्गियः ततो विरोचनः ततः संवेद्यः ततो भास्वान् ततो दत्तसेनः ततः सौम्यः
ततो अ

श्वदत्तः ततः सौराङ्गः ततश्चित्राङ्गदः ततः शिरध्वजः ततो मेधावी ततः परीक्षित
तः ततो जयसेनः ततो विजयसेनः ततो वृषध्वजः ततः शक्तिः ततः प्रगल्भः ततः को
लाहलः सएवानन्तवर्माभवत् ॥ घनकनकसमृद्धोगङ्गावाङ्गिप्रसिद्धः सकल
विषयभूतः स्वर्गवर्गोपभोग्यः । तदधिपतिरथाद्योनन्तवर्मान्दपेन्द्रः समभवदिति
रूढा गङ्गनाम्ना तदाद्याः ॥ कोलाहलः समरमूर्द्धि ततो नृपाणां भूतो यतः सवपुरं

Plate II, obverse.

च तदीयमत्र । कोलाहलाङ्गयमभूत् सुरसद्गतुल्यं यस्मिन्क्रमैर्नृपतिभिर्वज्रभि
र्वभूवे । राज्यश्रीभूति नारसिंहनृपते ज्यैष्ठे किमत्रास्महे दोर्दण्डार्जितभूतलोष्ठित
रमाकण्ठग्रहानन्दिनः । किंचास्माकमियं भुजासिलतिका संवेष्टतां वैरिणां क
ण्ठारण्यमियं च कीर्तिलतिकाद्या नः समारोहतु । भ्राम्यद्भिर्विजिगीषयाक्षितित
ले कापि द्विषदन्दिनैः कापि द्वेषिकुलप्रमाथिभिरपि प्राप्ताः कलिङ्गाः किल ।

तैः कामा

र्णवपञ्चमैर्नृपवरैः युद्धं कलिङ्गैः समं प्राप्तं द्रष्टुमिवार्णवाद्दुदगमत् कूर्मावता
रो हरिः । कूर्मस्वामिनि साक्षिणि त्रिनयने तस्मिन् महेन्द्रं गते गोकर्णेपि
महोदधौ वि

यति वा सूर्ये तथेन्दावपि । कालिङ्गीं भुवमाहरद्भुजवलादन्योपभुक्तां चिरलक्ष्मीं
चेत्यथ का स्तुतिर्वद ततो गङ्गान्वयस्याहवे । तत्रासीदंशकर्तासौ कामार्ण
व महीपतिः । यस्यैते पुत्रपौत्राद्या राजानः ख्यातविक्रमाः । शास्त्रार्थ

निश्चितमतिः द्विषदन्तकारी सर्वार्थिवर्गपरितोषणहेतुवर्गः । आचार
तोपि मुनिपुंगवमार्गचारी तस्मादभून्नृपवरो भुवि वज्रहस्तः । न ना
मतः केवलमर्थतोपि स वज्रहस्तस्त्रिकलिङ्गनाथः । को वज्रहस्तादपरः
पृथिव्यां वज्रं पतदारयितुं समर्थः । व्याप्ते गङ्गकुलोत्तमस्य यश
सा दिक्चक्रवाले शशिप्रायेणामलिनेन यस्य भुवनप्रक्लादसंपादि
ना । सिन्दूरैरतिसान्द्रपंकपटलैः कुम्भस्थलीपट्टकेष्वालिम्पन्ति पुनः
पुनश्च हरितामाधोरणा वारणान् । महिषी नंगमा तस्य पार्व्वतीव पिनाकिनः
तस्मात्त

स्यामभूद्दीरो राजराजो महीपतिः । स राजराजो द्विजराजकान्तिः भुजङ्गराजा
ननव

स्यकीर्तिः । श्रीमत्तयाधःकृतराजराजः स्वविक्रमान्नयकृतदेवराजः । तस्याग्रमहि
षी रम्या नाम्नाभूद्राजसुन्दरी । लक्ष्मीर्नारायणस्येव चन्द्रस्येव च रोहिणी । ततस्तस्याम
भूद्दीरश्चोड़गङ्गो नरेश्वरः । क्षौणीभृत्पक्षविच्छित्यै दिवीन्द्रात् कुलिशं यथा ।

धात्री तस्य

सरस्वती समभवन्ननं नचेत् पीतवान् । तत्सारस्वतमार्यं वालकतया श्रीचोड़गङ्गः
पयः ।

तादृग्वेदमतिः कथं निपुणता शास्त्रेषु तादृक्कथं । तादृक्काव्यमतिः कथं परिणतिः
शीले

षु तादृक्कथं । क्षौणीं दिक्पालशेषामयमकृत(त)पदद्वन्द्वमेतस्य वैरिष्णभृच्चूडाश्रिया

Plate II, reverse.

मं स्तुतिरिति कियती चोड़गङ्गेश्वरस्य । नूनं पूर्णः शुधांशुः परन्तु
पधवलच्छत्रबुद्ध्यापहर्ता । मामित्यङ्गस्य वृद्धिं त्यजति यत इव च
स्तचित्तः प्रवीरात् । गृह्णातिस्म करं भूमेर्गङ्गागौतमगंगयोः । मध्ये पश्यत्सु
वीरेषु प्रौढः प्रौढस्त्रिया इव । प्रतिभटकरशस्त्रव्याहृतिस्त्राङ्गनिर्यगुधिरम
वनिनिष्ठं नो भवेद्यत्तदैव । निजकरघृतशस्त्रच्छिन्नभिन्नाङ्गमेतानकृत धरणिश
य्यान् द्वन्द्वयुद्धेषु गंगः । यत्तेजःपरिभूतशत्रुनगरप्रोद्धूतधुमोद्गमैः भूयः खाण्डव
दाहशंकिमनसो देवाः परं भीरवः । स्वर्गीतादसिधारया रिपुगणादाकर्ण्य वार्त्ता
मिव प्रौढं तस्य नुवन्ति गंगन्तपतेभीतिं विहाय ध्रुवं । क्रोधोद्यद्विपमेघमालिनि
मदस्रोतस्वतीदुर्गमे चंचत्खड्गतडित्प्रभावति नदन्नाराचवचोदये ।
सत्सैन्ये जलदागमप्रतिनिधौ जेतुं प्रवर्त्तत कः शूरोपीति वदन् त्रिलोच

नविभुर्वज्रोमुना संगरे । निर्मथ्योत्कलसिन्धुराजमपरं गंगेश्वरः प्राप्त
वानेकं कीर्त्तिसुधाकरं पृथुतमं लक्ष्मी धरण्या समं । माद्यदन्तिसह
खमश्चनियुतं रत्नान्यसंखानि वा तत्सिन्धोः किमिमं प्रकर्षमथवा ब्रू
मस्तदुन्मायिनः । पादौ यस्य धरान्तरीक्षमखिलं नाभिस्तु सर्वादिशः श्रोत्रे
नेत्रयुगं रवीन्दुयुगलं मूर्द्धापि च द्यौरसौ । प्रासादं पुरुषोत्तमस्य नृप
तिः को नाम कर्तुं क्षमः तस्येत्यादिनृपैरुपेक्षितमयं चक्रेथ गङ्गेश्वरः ।
लक्ष्मीजन्मगृहं पयोनिधिरसौ संभावितस्य स्थितिर्नो धाम्निश्चश्वरस्य (in B नो-

धुमिश्वरस्य) पूज्यत इति क्षी-

राब्धिवासः ध्रुवं । निर्विस्मः पुरुषोत्तमः प्रमुदितस्तदासलाभाद्रमाप्येतद्भुतगृहं
वरं पिष्टगृहात् प्राप्य प्रमोदान्विता । त्वं कुर्माधिप मा चल त्वमपि भो व्यालेन्द्र
धैर्यं वह

त्वं पृथ्वि स्थिरतां व्रज त्वमधुना ब्रह्माण्ड गाढं भव । श्री गंगाधिपवद्वसिंह विसर-
तद्वीषा

ज्जगद्वापिनो दिङ्नागेषु भयाच्चलत्सु जगती कम्पेत वा यत् क्रमात्⁽¹⁾ वर्षाणां स
मतिं (तो in A) वीरः क्षौणीसंभोगमाचरत् । दिङ्नायकान् प्रतीहारान्
विधायाशासु सर्व्वतः ।

किं प्राप्ता महिषी तपोभिरतुलैः श्रीचोड़गंगेन सा । देवैस्तुल्यगुणैर्विभूषिततनुः
कस्तु

रिकामोदिनी । नाविष्णुः पृथिवीपतिः प्रभवतीत्यस्मिन् हरौ वा भूवो रक्षार्थं
धृतजन्म

Plate III, obverse.

नि स्वयमसौ लक्ष्मीः प्रसूताथवा । तस्यां ततो जनि जयन्त इवैकवीरः कामा
र्णवस्त्रिजगदेकवदान्य एषः । सूर्य्यं प्रतापविभवेन जगत्प्रसिद्धकीर्त्तिः
शशांकभधरीकृतवान् विशुद्धा । गंगेशसूनोर्विवुधाश्रयस्य दृप्याद्विषदं
शविभेदशक्तेः । कामार्णवस्यास्य कुमारकत्वं न नामतः केवलमर्थतोपि । प्राप्यो

(1) The following additions in B after क्रमात् (B. II. 35-40) :—

अनम्यानगरात् कलिङ्गजवलप्रत्यग्रभग्नादतिप्राकारायततोरणाप्रभृतिनो गङ्गातटस्थात्ततः ।
थोधास्त्रैर्युधि जर्जरीकृतलषद्राधेयगात्राकृतिर्मङ्गाराधिपतिर्गतो रणभुवो गङ्गेश्वरानुद्रुतः ॥
ब्रह्माण्डाद्वहिरस्य कीर्त्तियशसा व्याप्तं न वा भारतो दत्तस्वार्थिजनाय हेमनिचयः संकल्पनेर्वा बह्वः ।
निर्दग्धारिचयश्च भावितबलैः स्वस्य प्रतापैर्न वा किंवा नो कृतवानयं स्तुतिपदं श्रीचड़गङ्गेश्वरः ॥

दयं शृणांकस्य वर्द्धतां नाम वारिधिः । वर्द्धते कीर्त्तिचन्द्रोयं चित्रं कामार्णवोदये ॥
वेदत् (देवतु in B) व्योमचन्द्रप्रमितशकसमा प्राप्तकाले दिनेषु चापस्थेन्यग्रहौघे

वलवति रिपुषु प्र

क्षयं प्राप्तवत्सु । अस्मिन् मूर्द्धाभिषिक्ते नृपवरतनये सर्व्वलोकैकनाथे श्रीमत्
कामार्णवे

शे जगदभवदिदं तत्तदानन्दपूर्णं । क्षीरार्णवादजनि चन्द्रकलेति वार्त्ता कामार्णवात् तु
सकलेन्दुदिवाकराभं । कीर्त्तिप्रतापमिथुनं सहकारि लोके स्थित्याह्वयत् परन्त
पाननुरागशून्यान् । यस्यासिनिर्दलितवैरिकरीन्द्रकुम्भनिर्मुक्तमोक्तिकफ
लान्यसृग्दितानि । कामार्णवस्य रिपुसंहतिहेतुकाले सन्ध्याम्भवम्भुभगणा
इव भान्ति युद्धे⁽¹⁾ । सप्ताम्भोधीन्वहन्ती क्षितिरतितरला नागकूर्मेश्वरानां साहा
य्यं वाञ्छतीयं तदपि पुनरयं कल्पितस्तत्र भारः । धात्रा कामार्णवाख्यः स तु
निजतुलनानिर्दयः स्वर्णभारैः भूयोभूयस्तुलायां स्थित इति धरणेर्भारवाज
ल्यमाप्तं ॥ हृष्टपुष्टजनाकीर्णं विद्वज्जनमनोहरं । दशाब्दानकरोद्राज्यं कामार्ण
वमहीपतिः ॥ श्री चोडगङ्गनृपतेर्महिषी ततोऽन्या तस्येन्दिरा रविकुलोद्भव
राजपुत्री । अद्यापि धातुरूपमाजनि सुन्दरीणां सेयं शुधांशुवदनास्तपसैव
जाता । यद्रू

पशीलगतिवर्णनया प्रसिद्धा दृष्टान्तभूर्गिरिसुतेत्यभिधान्यदोषाः । तासोरचण्ड-
कूलिक

सहस्राय द्रुत वा मिन्दिरामुदवहत् भुवि चोडगङ्गः । तस्यां ततः समजनि
क्षितिनाथ

नाथः श्रीराघवः परनरेश्वरदर्पमर्दौ । यत्पट्टवंधनविधिः श्रवणातिभीताः सर्व्वे
नृपाः स्व

(1) The following additions in B after युद्धे (B. III. 3-7):—

दृष्टद्वैरिचमूर्मया कवलिता नैवं मया खादितेत्यन्योन्यं कलहे तु निर्णयाविधौ खड्ग-
प्रभावेच्छया ।

माध्यस्थं गमितेव निर्मलतमा कीर्त्तिस्त्वदीया ब्रवीम्यालोच्येह महद्भिरित्युपगता धातुः
श्रुतीरादरात् ।

असाक्षौत् स हिरण्यगर्भमपरे लोके महेशः पुरेत्युत्कृष्टं प्रवदन्ति ये तु वदनव्रातो-
विरुद्धोधुना ।

तेषां यत्तु हिरण्यगर्भमकरोत् कामार्णवेशः स्वतः सम्पन्नं जनितं जगद्यत इह प्रत्यक्षतः
प्राणिनां ।

हृदिकम्पमवाप्तवन्तः । श्री राघवे राजनि चित्रमेतत्तेजोविहीनः क्षितिपालवर्गः ।

यत्पादसे

वाकृतदेहसिद्धिर्मित्रीभवत्येव समस्त एषः । प्रौढारिप्रहतिप्रकारविहितप्रा-

चण्डप्रपा

त्रीभवद्दोर्दण्डोपमितिप्रगल्भविषयः प्राग्भूतवानर्जुनः । संप्रत्याह्वरंगसंगत
रिपुश्रेणीशिरःकन्दुकक्रीडासक्तभुजः शरासनभृतामेकोपमा राघवः । जग

Plate III, reverse.

ति परशुरामः प्रादुरासी(द्)द्वितीयः किमुरिपुकुलहन्तास्त्राज्ञया कृन्नलोकः । क्षि-
तिवितरणदीक्षासक्तहस्तः प्रतापादपि दशशतवाज्जयस्यशत्रुर्विनाशी । भेदं
भेदमरातिकुंजरघटां क्षौणीन्द्रपंक्तिं रणे पायं पायमसृक्पयांसि बद्धधा
श्रीराघवाग्निः क्षणात् । शुभं शुभमिवोदहन्द्विजपतेः कीर्त्तिप्रतानं परं चन्द्रं
चन्द्रिकया प्रपूर्णतरया संसेव्यमाकांक्षते । दूर्गेषु दावदहनः क्षितिभृत्सु वज्रो
माद्यत्करीन्द्रघटनाविधिसिंह एषः । विद्वेषिभूमिपतयोनिवसन्ति यत्र श्रीराघवः
क्षितिपतिर्विततप्रभावः । श्रीराघवो धराधीशः क्षौणिपालशिरोमणिः । अकरो
द्राज्यमब्दानामुद्दामो दशपं(सं in B)च च । तस्य श्रीचोडगंगक्षितिवलयपतेर्विश-
सन्तान

वल्लीकन्दः श्रीचन्द्रलेखा स्फुटमदितिरिव प्रेयसी कश्यपस्य । तस्या
मुद्दामधामक्षयितदिनमणिर्जज्ञिवात्राजराजो राजन्यक्षोदली
लातिलकितमहिमव्याप्तदिक्चक्रवालः । तस्मिन् दिग्विजयप्र
याणरसिके संरम्भसर्पचर्मसंक्षुप्तक्षितिचक्रपांशुपटलप्रस्तारव
त्यम्बरे । भूसंपर्कघृणावशाद्दिनमणेरुच्चैः क्षुतं सप्तिभिः सुन्यस्तं सुर
सिन्धुरेण धरणीपट्टे रदोद्धटनं । चोडगंग नरेन्द्रस्य सूनुरुद्दामवि
क्रमः । राजराज इति ख्यातो राजराजो महीपतिः⁽¹⁾ । एतस्यां भुवि पं

(1) The following additions in B after महीपतिः (B. III. 31-36) :—

विश्वं क्रोडयति प्रगल्भ-वचसि प्राप्तेयशैलद्युतो यद्युद्यादगभूदभूतसदृशं सन्तस्तदाकर्णतां ।
चन्द्रः पीठति लङ्कति स्वभवनं प्रासादते तद्युशो दिङ्नाथाः प्रतिमन्ति तस्य परितः शत्रुः
पदे भङ्गति ।

सानन्दं विदधाति चेतसि भवत्कीर्त्तिगुणग्राहिणः स्मृते दोहदमथिनः प्रतिदिन
श्रीराजराज भ्रुवं ।

येयं सम्प्रति याति गण्डयुगयोर्दिक्कुञ्जराणां भ्रुवं याचारामवतां सुसम्बल्यत्याशापतीनां
गृहं ।

चविंशतिसमाः क्षापाललक्ष्मीधवः कृत्वा जित्वरस्वीयचंचलभुजा द
म्भोलिरुर्वीपतिः । वीरः प्राज्ययशस्तुषारकिरणश्रेणीरसावासनादुदगच्छत्
सुरलोकवाञ्छितयशाः श्रीराजराजो नृपः । तस्यानुजो नृपतिराज्यपदेभिषिक्तः
सूरिप्रियः परिमितादिनृपप्रशस्तिः । पृथ्वीपतिः कलिमलोन्मिषतधर्मशुद्धः
कार्यक्षमः प्रभुरसावनियङ्गभीमः । वीराधिष्ठितसंगराद्रिशिखरे शङ्खस्रना
सादिते कुन्तोद्भिन्नमहेभकुम्भविगलन्मुक्तावलीपुञ्जिते । हर्षादुग्रनिजप्रताप
दहने खड्गस्रचा विद्विषां राज्ञामाननपंकजानि नृपति ऊँत्वानयद्यः श्रियः ॥
क्षीराब्धेर्मथितात् सुरासुरभुजव्यापारविद्धोभितात् चन्द्रस्यार्द्धमभूत्तदप्यधियया
वीशानमेकं किल । चंचदाज्वलेन संगरभुवि त्वत्खड्गधाराजलाज्जातस्त्वष्टदिगी-

Plate IV, obverse.

श्वरान् पृथुयशश्चन्द्रः समालिङ्गति । यत्प्रयाणसमुद्धतरजःसंहारितेम्बरे ।
अभूद्विरदराजस्य धुलीधूसरिता तनुः । दशवर्षाणि वीरोसौ निर्जिताराति
मण्डलः । अनङ्गभीमभूपालो धरित्रीं समपालयत् । प्रौढानर्गलविक्रमः कुल
गृहं यो दण्डनीतिश्रियः सत्याचारविचारचारुचरितः पुण्यैकपारायणः ।
तस्यासीदनियंगभीमनृपतेरर्द्धांगलक्ष्मीः स्वयं देहश्रयातिशयेन पट्टम
हिषी वा(ब्रा in B)घल्लदेवी भुवि । तुलितपिटगणौघः सूनुरासीदमुष्यां निरति-
शयितते

जा यौवनावान्नराज्यः । प्रणतनृपतिचूडारत्नरोचिःपिशङ्गीकृतचरणसरो
जो राजराजोनृपालः⁽¹⁾ । यस्मिन् शासति शासितारिनिचये सम्यक्समुद्राम्बरां पृ
थ्वीं पार्थिवपुंगवे नृपगुणैः श्रीराजराजे नृपे । चक्रे माधव एव तैक्ष्णमधिकं
कौक्षेयके चिन्तनं शास्त्राभ्यासविधौ विशेषजडता काले कलेः श्रूयते⁽²⁾ । त्यागे
यो धनदो युद्धे भीमार्जुनयुधिष्ठिरैः । सदृशोयं महावीरो राजराजो

(1) The following additions in B after नृपालः (B. IV. 2-4):—

तस्योद्यद्वाजिराजिप्रखरखुरपुटाघातवेल्लभ्रिचौष्टोत्तिष्ठितानद्यतिशमितदिवानाथतेजः
समूहं ।

विस्तीर्णं कर्णतालाहतिभिरविरतोन्मत्तसेनागजानामष्टानां दिग्गजानां मुखपटतुलना
मादधे धूलिजालं ।

(2) The following additions in B after श्रूयते (B. IV. 6-8):—

यत्कीर्त्तिदुग्धजलधिभे(व)नान्नरालं संप्राप्य दूरतरमुच्छलितो विभाति ।

भासां मणिः स्फुटरुचिर्गङ्गे समन्तात् स्रक्ष्मातिस्त्रक्ष्म इव यत्परिदर्शनीयः ।

महोपतिः⁽¹⁾ । चालुक्यकुलसंभूता वेला सौन्दर्यवारिधेः । नाम्नास(सी?)द्गुणदेवी-
ति महिषी तस्य भूपतेः । तस्यामभूदद्भुतविक्रमश्रीः श्रीमानयं भूभट्टनं
गभीमः । विराजते कीर्तिसुधातरङ्गधौतासु दिग्भित्तिषु यत्प्रशस्तिः⁽²⁾ । कथं
भोः कलिरस्मि किं तु विमनाः कस्मै निवेद्यात्मनः शोकाम्भोधिमपाहरा
मि कुशली किं खित् शिवो वा हरिः । यः सूरः कलयास्मदीयसमये विक्षिप्य गं
गान्वये जातः श्रीमदनंगभीमनटपतिः सोनर्थभूतो मम⁽³⁾ । यस्यानर्गलविक्रमार्जि
तयशःक्षीरोददानोर्मिभिः दातारः किल कामगोप्रभृतयः प्रोत्सरिता दूरतः । किंचा
यं च हिरण्यगर्भकलनावैदग्ध्यमाकर्णयन् लज्जालोलचतुर्मुखाक्षिनिवहो मन्ये महा
नृपद्मभूः⁽⁴⁾ । आकर्षता हृदयमेणविलोचनानामाधुन्वता च परितः प्रतिपार्थिवानां ।

अथै

दयप्रणयिना कृतिनामनंगभीमप्रसिद्धिरधुना विदधे नृपेण । जगाम धाम देवानां सदै
व सेवकप्रियः । भुक्त्वा भुजप्रभावेन त्रयःत्रिंशत् समाः पुमान् । श्रीकस्तूरादेव्याम-
दितौ त

स्माच्च कश्यपादुर्था । जगदुद्धर्तुं जातः पापिकहन्ता हरिरिव क्षापः । असुरेन्द्र-
शोणि

तनिवेशविश्रतामपनीय सोथ वज्रदानवारिभिः । करमात्मनः तमधुना विशो-
धयन्नरसिंह

(1) The following important additions in B after महोपतिः (B. IV. 9-10):—

राजराजोनरपतिर्दशसप्त च वत्सरान् । सुवि राज्यश्रियं भुक्त्वा स्वाराज्याय प्रतस्थिवान् ।

(2) The following additions in B after प्रशस्तिः (B. IV. 12-14):—

तस्यानर्गलदोः प्रतापलहरीलावण्यवीचित्रजक्रन्दत्वैरिवधूविलोचनजलापरैर्द्वैरा दन्तरा ।
किं चोत्सर्गतरङ्गभङ्गकलनैः पाथोधियानोच्छ्लाद्ग्रीडावक्रितकम्बरः स भगवान् सिन्धौ
पुराणो मुनिः ।

(3) The following additions in B after मम (B. IV. 17-20):—

ध्यानानुबन्धिनिविडप्रसरप्रमोदं माध्वीकसुगन्धमहृणं हृदयारविन्दं ।
देवः पुराण पुरुषः परिरभ्य यस्य रोलम्बडम्बरकलां कलयां चकारः ।
लक्ष्मीरक्षणसौविदक्षपदवीं प्रत्यर्घिष्ट्वौभूजां प्राणार्कषणरज्जुविभ्रमतुलासुदाममासञ्जयन् ।
संग्रामस्थलकेलिताण्डवकलापाण्डित्यमामण्डयन् यस्यायं ज(ग)ददुभुतैकविलसत् क्रौडा-
नटः सायकः ।

(4) The following additions in B after पद्मभूः (B. IV. 22-23):—

येनाभिषेकसमयः कलितत्रयेण नीतः तुलापुरुषदानफलानुबन्धैः ।
लब्ध्वापि न क्षितिरमुष्य मुदे तथाभूद्यादृग्द्विजातिजनशासनदानकेलिः ।

Plate IV, reverse.

एष जगति स्फुटोभवत् । श्वेतातपत्रशितचामरचारुमूर्तेर्दिग्दन्तिदन्तप
रिमण्डलमण्डपस्य । अंके कृतस्य सुतभावनया भवान्या सिंहासने जयति यस्य
पदं सदैव । राज्ञा (main B) नरेन्द्रजननी (युवती ?) नयनांजनाश्रुपूरेण दूरविनिवे-
शितकालिमश्रीः । त

द्विप्रलम्भकरुणाद्भुतनिस्तरंगा गंगापि नूनममुना यमुनाधुनाभूत् । कुर्वन् प्रकाश-
मनिशं द्वि

जसाच्च कृत्वा मेरुं तुलापुरुषमुख्यमहार्यदानैः । स्वान्तःपुरैः सह सदृक्कलयन्ति
कोणाको

णे कुटीरकमठीकृतमुष्णरश्मिं⁽¹⁾ । कृत्वा निर्मथितद्विषं वसुमतीमब्दांस्त्रयस्त्रिं
शतं सुक्ता भोगमनु

त्तमं नरपतिः दोगर्भसर्व्वकषः । स्नेहात्यन्तविनाकृतोन्तिमदशामासाद्य दीपोपमः
प्राप्तः

कालपतङ्गपुंगवदशां यातिस्म निर्व्वाणतां । तस्य श्रीमान् सुदिनविधये
मालत(वे ?)न्द्रात्मजायां

सीतादेव्यामजनि तनुजो भानुवद्भानुदेवः । पद्मोल्लासं विदधदतुलं कैरव
स्नानिसुचैर्द्वयसी परधरणिभृण्मौलिविन्यस्तपादः । वद्धमुष्टिरपि निर्भरदा
ता वेपनोपि समरैकधूरीणः । उग्रमूर्तिरपि कृष्णशरीरो यत्करेण कलितः
करवालः⁽²⁾ । आचन्द्रार्कफलोपभोगसुलभान्यत्युच्चसौधावलीशोभाविस्फुरि
तानि शासनशतान्येव क्षमायागुरुः । सुच्छायानि रसालपूगपनसप्रायै
स्तरुणां गणैः कृत्वा ताम्रविलेखितानि विधिवत् सच्छोत्रियेभ्यो ददौ । प्रिया

(1) The following additions in B after मुष्णरश्मिं (B. IV. 33-35):—

अष्टाशाचक्रवालघमण्यमहायाससम्भावितक्षुत् चावेक्षूदन्वदम्भस्युपगत अपि चालम्ब-
सत्त्वा सुरायां ।

सर्पिःसंसर्पदायुः दधि मधुरमथास्वाद्य दुग्धेन दृष्ट्वा यत्कीर्तिः कान्तमूर्तिः सलिलनिधि-
मथाकाममाचामतीव ।

(2) The following additions in B after करवालः (B. IV. 41-44):—

पायं पायं हविरविरतं प्रस्तुते यस्य यज्ञे जाताजीर्णं हरिरतितरां याति निद्रां समुद्रे ।
धमोद्गारीलवणसलिलं पीयते वाङ्मोघिः प्रोद्यच्छूलः समजनि शिवः कालकूटाशनोऽपि ।
ब्रूमः किमस्य तुलनां लघुतोपनीततत्प्रतिक्षितिभृतः किल दानशौण्डान् ।
सद्यो यदेप कनकाचलकामधेनुकल्पद्रुमानकृतनिर्जितसम्पदस्तान् ॥

जाकल्लदेवीति तस्यासीद्भानुभूपतेः । कटाक्षपातनिक्षिप्तकन्दर्पकरसा
यका । अन्तःपुरवधूवन्दचूडामणिमरीचिभिः । कृतनीराजना नित्यं यत्पा
दकमलद्वयी । तस्यामभूदद्भुतविक्रमश्रीः कविप्रियः श्रीनरसिंहदेवः । आकर्णयन्
यस्य

कुमारकालकथां कुमारोपि जहाति गर्वं । श्री वीरभानुनटपतौ त्रिदिवेश्वरस्य
तस्मिन् प्र

याति⁽¹⁾ पदवीं सुरवन्दवन्द्यां । वर्षाणि सप्तदश भूवल्लयं भुजाभ्यां भुक्ता तु यः
सपदि शत्रु

कुलं विभेद । कन्दर्पो हरिणीदृशां रिपुगजश्रेणीषु पञ्चाननो भूदेवद्युतिरिन्दु
सुन्दरमुखः

श्रीमान् नृसिंहोत्पः । यत्तदोर्दङ्गकपाणदारितपरपृथ्वीपतिप्रोञ्जलद्रक्ता यास्तु-
नदी क्षरितक्ष वि

हृहो नाद्यापि विश्राम्यति । आकर्ण विश्ववलिकर्णरूपं संपूरणामृतवशापि
तमन्यमेव ।

वाचां विलासमसकृत्तु विकल्पमानो वाचंयमो भवति वाक्पतिरेव यस्य । तस्य
प्राणप्रिया चोडदेवी दैवत

वल्लभा । रूपयौवनसौभाग्यनिर्जिताखण्डलप्रिया । अजनि रजनिजानिश्रीरयं
चोडदेव्यां महितनृ

Plate V, obverse.

पतिरत्नं गङ्गवंशावतंसः । परनरपतिलक्ष्मीमौलिरत्नप्रभाभिः श्वलित इव नित्यं
लक्ष्य

ते यस्य पादः । चतुस्त्रिंशद्वर्षाण्यवनिवलयं निर्गतरिपुं निरातङ्को भुक्ता हरिचरण-
सेवासुर

सिकः । सुराधीशस्यार्द्धासनविहितसम्मानकुतुकं समास्ते यः सख्यं कविकुमुद-
चन्द्रो न

रपतिः । विद्यानां वासभूमिर्विषमशरभवो राजलक्ष्मीभुजङ्गो धौरेयः शस्त्रभाजां
निजनग

रवधूलोचनानन्दचन्द्रः । वीरः श्रीभानुदेवोभुजयुगपरिखायञ्जितां शास्ति पृथ्वीं
ताते पौर

(1) B plate IV ends here. The Vth plate of B is missing.

न्दरीनां हरिणशिष्टुट्ठां कामुकत्वं प्रयाति । राज्ञो यस्य गयासदीनसमरप्रारब्ध
शौर्यक्षत

प्रौढानेकनरेन्द्रकन्धरगलत्किलालपूर्णावनिः । तत्कालक्षतवक्षसः करिकुलात्-
स्फारो स्थितः शोणितासारोद्यापि दिगन्तरेस्ति विलसत्सन्धानुरागकृलात् ।

भूषणं (क) वचं यस्य निवा

सो भूभृतां श्रियः । निकेतः सर्वविद्यानां भानुदेवो महीपतिः । न नामतः
केवल मर्थतोपि प्रिया भवत्तस्य नृपस्य लक्ष्मीः । विलेव लावण्य सरित्
प्रियस्य लतेव सौजन्यमहीरुहस्य । जातस्तस्यां रिपुकरिघटाभेदसिं
हो नृसिंहो यो वालोपि क्षितिपतिशिरोमौलिमालां पिनष्टि । श्रुत्वाप्यस्योदय
दिनकथाः शक्तभूमीपतीनां हारव्याजात् पतति हृदये वीरलक्ष्म्यश्रुपूरः ।
वीरभानुधराधीशश्चतुर्विंशतिवत्सरान् । भुक्त्वा महीं सुराधीशशास
नस्यार्द्धभागभूत् । ताते सुरेन्द्रवनितानयनारविन्दसन्दोहविस्मयभु
जि क्षितिपालरत्ने । यः शास्ति तु क्षितिमिमामरिराजराजिराजीवशी
तकिरणो नरसिंहदेवः । कर्णः कर्णपथं न याति कृतिनां यद्दानमाकर्णयन् ते

कल्पद्रुम

कामगोप्रभृतयः संप्रार्थनादायिनः । लोकेभ्यो यदयं ददाति सततं ध्येयं
न तच्चेतसा किं

ब्रूमो महिमानमस्य नृपतेर्लोकत्रयाल्लादिनः । तुलापुरुषदानेषु श्रीनृसिंहमहीप
तेः । व्रजन्ति न तुलां यस्य भुवि कर्णादयो नृपाः । तुरङ्गराजीक्षुरविक्षतोर्वीक्ष
रद्रजोभिः

कलितेन्तरीक्षे । यस्य प्रयाणेन्वयमाश्रयन्ति मन्दाकिनीपङ्कजकाननानि । तस्य काम
लदेवीति प्रिया सद्देशभूपजा । अन्तःपुरवधूमौलिमालार्चितपदद्वया । भानु
वद्भानुदेवोयं

जातस्तस्यां महीपतिः । कमलानन्दनः श्रीभानुचैरुचैर्महीक्षितां । गंगान्वये
नरहरेर्नृ

पतेस्तनूजः सन्मित्रपङ्कजविकाशसहस्रभानुः । श्रीभानुदेव इति भूपतिराविरास्ते
यस्तेजसा

Plate V, reverse.

रिपुतमोमिवहं निरुन्धे । ताते पुरन्दरपुरीतिलकायमाने भुक्त्वा तु विंशतिसमाः सहि
ताश्चतुर्भिः । यो रक्षति क्षितिमनर्गलदोःप्रतापज्वालावलीकवलिताखिलप्रयाणैः ।

(¹) यस्य प्रस्थानकाले तुरगक्षुरपुटोज्ज्वलधूलीकलापैः संक्ले तौग्मभानौ दिशि दिशि स
हसा संकुचन्त्यम्बुजानि । खिद्यन्ते चक्रवाकाः सहचरगृहिणीविप्रयोगं भजन्तः
किं च खेच्छा

भिसारं कलयति परितः खैरिणीनां समूहः । (²) वेलोक्षसद्विद्रुमशंखसार्थव्याजेन
यस्यारि

निसूदनस्य । तेजो यशश्चान्य नृपैरलंघ्यं व्यनक्ति नित्यं सरितामधीशः । ह्रीरा-
देवीति तस्या

सौन्महिषी सहिता गुणैः । चालुक्यकुलसंभृता लक्ष्मीर्लक्ष्मीपतेरिव । तस्याम-
जायत दया

विनयप्रभावसौन्दर्यधैर्यनयकीर्तिकलानिवासः । वीरः कुमार इव पर्वतराजपुत्र्यां वि
श्वप्रसिद्धमहिमा नरसिंहदेवः । तेजोद्भूतं किमपि भाविकमुन्नयद्भिः सं
भावितः शिशुवयस्यपि यस्य पादः । ना राज्य इव भूपति मौलिरत्नमूर्द्धणि
वारि कमलाविक्ररोत्कराश्च । एतेन सर्व्वगुणरत्नविभूषणेन विद्यावि
वेकविमलीकृतमानसेन । नारायणेन वसुदेवइवात्मजेन प्रीतिं निरन्त-
रमविन्दत भानुदेवः । स षड्विंशतिवर्षाणि भुक्त्वा राज्यमकण्टकं । नयना
नन्दनः श्रीमान् प्राप्तः पौरन्दरीं पुरीं । ततः कृतज्ञैः समुपास्यमानः स
न्मन्त्रिभिः श्रीनरसिंहदेवः । महीपतिनीतिकथानुवर्त्ती विभर्त्ति पृथ्वीवल
यं भुजेन । प्रस्तुन्वयच्छनमुन्मनाः प्ररतयगीताभिनीनिक्रमं श्रून्यध्यानमि
षाण्मुज्जर्दिविषदां प्रापे(स्त्रे?)षु वद्धस्पृहः । हेला निर्जित पञ्चवाणविभवमंग-
प्रभामिच्छि

तुं यस्येनोषनि यौवने सुरवधूवर्गं क्षितिं कांक्षति । तर्कः षाङ्गुण्यमन्त्रीसमर-
गुरुभरे वा

ऊचक्रं सहायः शौर्यं सर्वांगरक्षा निजरिपुहनने हेतयो यस्य सेनाः । स
श्रीमानुत्कले

न्द्रः प्रतिनृपतिशिरःश्रेणिषु क्रीडमानोराजीवाक्षालिमाद्यत्करीवरविलसदीर-
लक्ष्मी-

र्विभाति । यद्दूरप्रयासरासमराभूः कंकालमालाकुलायल्लोके शतयज्ञतोति
गहनः य

(1) This śloka is given further down in B. VI. 5-6.

(2) This śloka is to be found further down in B. VI. 10-11.

गमानवीणैः सुरैः । यत्कान्तेषु पुरतनेषु विरसः स्वर्वारनारीगणस्ता एताः खलु
 तस्य वैरि
 जपितो वीरस्य विक्रान्तयः । नेत्राम्बुपूरपरिवर्द्धिमहापगासु लम्बाक्षकांबुद
 निपीत मुखेन्दु
 भासु । प्रत्यर्थिमन्दिरपुरन्धिसभासु येन क्षुप्ता सदैव वसतिर्जलदागमस्य । कुर्वन्
 कुक्षिंभरि

Plate VI, obverse.

त्वंप्रतिकृतिकपटादाहृतैः सांयुगीनैः प्रत्यङ्गं चाङ्गदम्भादविरलपुलकाविष्कृतान्तः
 प्रमोदः । प्रत्यग्राखाभिभिश्चस्फुरितरुचिरयोदग्रहासाग्रहासो वैरिव्रातप्रमाथे
 कणम
 पि न दधे य(त्) कृपाणः कृपायाः । ईषद्रोषकषायितेन मनसा कालिंग राज्यश्रिये
 प्रस्था
 नप्रद्वितैर्वलैस्तत इतो यस्योत्तरंगीकृताः । अद्यापि स्फुटपुण्डरीकपटलश्रीगर्वसर्वं
 कर्षैः फेनैः कीर्त्तिमुदाहरन्ति विषदागोदावरीवीचयः⁽¹⁾ । वीरश्रीमान् जयति स
 कलक्ष्मातले ख्यातकीर्त्तिर्नेत्रानन्दः सरसिजदृशां भूपतिः श्रीनृसिंहः । केशाकृष्टि
 प्रतिह
 तश्चिरोरत्ननिर्भिन्नवेणी येनाकारि प्रथमसमरे वैरिणां वीरलक्ष्मीः । यस्याश्चदा-
 जिराजिप्र

(1) The following additions in B after वीचयः (B. VI. 4 et seq.)

निरर्गलं सेवलताधगामिनीं स पीडयद्वेककरेण गामिमां ।

दृषं पुरस्कृत्य समीहितं दुहन्नदृष्टपूर्वं स्फुटमेतिगोपतां ॥

After this comes the śloka mentioned in note 14. In line 6 comes

किं ब्रूमः क्षौणि भर्तुर्जगति गजपतेस्तस्यदानप्रकर्षं येनस्तब्धाद्युलोके वितरणविहित
 ख्यातयः कल्पवृक्षाः ।

गूढस्त्रिन्नामणिस्तु क्वचिदपिगहने वर्त्तते क्षाधराणां ब्रीडानघ्राच शंके बद्ध बहति
 तृणान्यानने कामधेनुः ।

यस्मिन् राजनि राजनीतिचतुरे संरक्षति क्षामिमामिन्दोरेव कलङ्किता सुरपतेरेवास्ति
 गोचारिता ।

शम्भोरेव विषादिता रतिपतेरेवैश्वरद्वेषिता विष्णोरेव विवर्णता जलनिधेरेव क्षमा
 हीनता ।

Then follows the śloka mentioned in note 15.

खरखुरभरोद्भूतधूलौकलापैर्वैकुण्ठस्यापिजातः कृतकमठतनोः स्तोकभारावता-
रः । सं

ग्रामाम्भोधिगच्छद्विरदघनघटाप्रक्षरदानधारासारान्मुक्ता प्रयाति क्षर
दमरधुनीं यद्यसौ राजहंसः । आकर्ण्यकर्ण्य यस्य द्रविणवितरणप्रक्रमा
न्नित्यमेव विचस्ताः सन्ति चित्तामणिविवुधगवीकल्पवृक्षा विलक्षाः⁽¹⁾ । स श्रीमा
न् वैरिवीरप्रमदगजघटातुंगकुम्भस्थलानां प्रौढः पञ्चाननोयं जगति वि
जयते भूपतिः श्रीनृसिंहः⁽²⁾ (॥ + ॥ ⁽³⁾शकन्तपतेरतीतेषु पञ्चाधिकेषु त्रयोद
शशतसंवत्स्करेषु चतुर्दशधनाधिपतीत्यादिविरुदावली
विराजमानः श्रीमान् नृसिंहदेवनृपतेः स्वराज्यस्य अष्टाङ्के
अभिलिख्यमाने चैत्रेमासि शुक्लेपक्षे त्रयोदस्यां तिथौ रविवारे वा
राणसिकटके विश्वकइ भावेदक समये श्रीचरणे भितरनवर कन्यामण्डप
वाङ्किञ्चाय विजयसमये दुआरपरीक्ष गङ्गेश्वर जेना वुडालेङ्गालाण्डु
सनिमिश्र भण्डारिञ्चा थाउ पोरोपरीक्ष माहापात्र नरेन्द्रदेव चक्रवर्ती
माहापात्र नरहरिदास प्रहराज माहापात्र श्रीपति मङ्गलराज अ
वधारिला ता । ए पोरोश्रीकरण स्पष्टेश्वर माहासेनापति बइदी माहासेनाप
ती मुदलेन महापात्र नरहरिदास प्रहराज कइक किनरि ग्रामर नाम विजयन
रसिंहपुर चतुःसीमासमाक्रान्त शासन करिदेवा । कलभोर उतरखण्ड मध्ये कि
नरि ग्रामर नाम विजयनरसिंहपुर । राउतपड़ा पाखर रसंवन्ध जित चिञ्चारिस

Plate VI, reverse.

पञ्चास माठ ४५० चान्दलो पाखर रसंवन्धा चिञ्चारिस पञ्चास माठ ४५० गा
त्रिहि अवदान-मध्य करि जित नअस ६०० माठ कइ पोरोश्रीकरण वड़(इ ?)
दासी-

महासेनापतिर सीमा कला प्रमाणे । अस्य ग्रामस्य पूर्वसीमा । मलय ग्रामर
कपिलेश्वर देवङ्गर देउलर पश्चिम विवाद सोलदण्डार वड़ कंकड़ा दण्डार
अर्द्ध आदिकरि आड़लग्रामर सोलडुइर पश्चिम सार्द्ध कंकड़ालुण्डादण्डार अ

(1) The portion आकर्ण्यकर्ण्य ... to लक्षाः omitted in B.

(2) The following addition in B after नृसिंहः (B. VI. 18-19) :—

राजमतङ्गजहिंहे नरपतिहिंहे प्रतापनरहिंहे । शासतिवसुधाक्षेतां धात्र्यां वधदन्धने
न जाते ।

(3) The passages regarding the grant in B are given at the end.

र्द्धं चुआ पाड़िग्रामर अनाइवृक्ष भूइर चत्तरदण्डा अर्द्धपर्यन्त सीमानमादि
 कृत्वा । दक्षिणसीमा । भाखरसाहिग्रामर चकलिआ अलण्डा विआलि ओत्वभुइर उ
 त्तर दण्डा अर्द्धवथपड़ाग्रामर उत्तर राक्कर अर्द्धवसाखण्डग्रामर दोसीमान्त वं
 ध उपर नाअपथर कलुमादिकरि लङ्कावड़ग्रामर उत्तर गा
 लीनइर अर्द्ध मकुलुण्डाग्रामर नइ तड़ पाणिशिला खंभार पूर्व-
 हिड़पर्यन्त सीमानमादिकृत्वा । पश्चिमसीमा । मकुलुण्डाग्राम
 र पूर्व पातुआ घाइर कोणावन्धर वड़वरगक्क वोकणाग्रामर पू-
 र्व दोसीमा पडिआ वसत अर्द्ध आदिकरि संघड़ाग्रामर खजु
 रिआ योड़ पश्चिम तड़ एग्रामर वसन्तरपूर्वदोसीमा राक्क अ
 र्द्धपर्यन्त सीमानमादिकृत्वा । उत्तरसीमा । उलटपुर शासनर
 दक्षिणकंकड़ा जोड़ अर्द्ध आदि करि वालपुरग्रामर दक्षिण
 अलक्षेपड़ार मध्यक दण्डार अर्द्ध अट्टहासपुर शासनर दक्षिण रोण्डोइ
 दण्डार वंधपर्यन्त सीमानमादिकृत्वा । एवं चतुःसीमा समाक्रान्त कलम्भोर उत्त
 रखण्ड मध्य मध्य । सीनः नअस ६०० माढ़ परिमित शासनाख्याविजयनरसिंहपु
 रनामानं किंनरिग्रामं स्वायुरारोग्यैश्वर्यसाम्राज्यसमृद्धये महापात्रनरहरिदा
 स प्रहराजाय सजलस्थलमक्ककक्कपपादपारण्यवालुकाभीठसहितमा
 चन्द्रार्कमकरीकृत्य प्रादात् । अस्य शासनस्यांगतया कौण्डिन्यगोत्राय य
 जुर्वेदान्तर्गतकाण्वशाखैकदेशाध्यायिने शासनताम्राधिकारिणे श्रीमन्महापात्र
 सन्धिविग्रहिक स्वप्नेश्वर नामधेय ब्राह्मणाय गृहवाटीसहितं वाटी चतुष्टयः ।

Plate VII.

एतत्ताम्रलेखक दूर्गादाससेनापतेर्वास्तुसहितमेतदर्थं । महानफलसि
 द्ध्यर्थं तद्रक्षाफलसिद्धये । मद्धर्मः परिपाल्येयं भूमेराचन्द्रतारकं । मा
 भूदफलशंका ते परदत्तेति पार्थिव । स्वदत्तादधिकं पुण्यं परदत्ता
 नुपालनं । स्वदत्तां परदत्तां वा यत्नाद्रक्ष युधिष्ठिर । महीं मतिमतां श्रे
 ष्ठ दानात् श्रेयोनुपालनं । स्वदत्तां परदत्तां वा यो हरेच्च वसुन्धरां ।
 स विष्ठायां कृमिर्भूत्वा पितृभिः सह पच्यते । निर्जने प्रान्तरे देशे शुष्ककोटरवा
 सिनः । कृष्णसर्पाहि जायन्ते ये हरन्ति वसुन्धरां । गामेकां स्वर्णमेकं वा
 भूमेरप्यर्द्धमंगुलं । हरन्नरकमाप्नोति यावदाभूतसंज्ञवः । शत्रुणापि
 कृतो धर्मः पालनीयो मनीषिभिः । शत्रुरेव हि शत्रुः स्यात् ध
 र्मः शत्रुर्न कस्यचित् । मद्रंशजाः परमहीपतिवंशजा वा पा

पादपेतमनसो भुवि भाविभूपाः । ये पालयन्ति ममधर्ममिमं
 समस्तं तेषामयं विरचितोज्ज्वलिरेष मूर्ध्नि । मदंश्यः परवंश्यो वा
 यः कश्चिन्नृपतिर्भवेत् । तस्याहं करलग्नः स्याम् यो मत्कीर्त्तिं न लुम्पति ॥ ० ॥⁽¹⁾
 शुभं भवतु । शुभं भवतु । शुभं भवतु ॥ श्री श्री श्री ॥

The following is the grant in the B plates :—

L. 19, plate VI, obverse et seq.

शकन्तपतेरतीतेषु षोडशाधिकेषु त्रयोदशशतसंवत्सरेषु च
 तुर्दशभुवनाधिपतीत्यादिविरुदावलीविराजमानः श्रीवीरन्नसिंहदेव नृपतिः स्वरा-
 ज्यस्य द्वाविंशत्यङ्के अभिलिख्य
 माने विक्का शुक्ल एकादश्यां मंगलवारे वाराणासि कटके श्रीचरणे भितर
 नवरे पुजानन्तर + + + तर वि
 जय समये पार्श्वे महापात्र कृष्णानन्द सांघिविग्रहिक माहापात्र लाण्डुरथ
 + + माहापात्र गोपीनाथ सान्धिविग्रही
 क पात्र भुवनानन्द सांघिविग्रहिक पात्र सिद्धेश्वर जेना द्वारपरिच्छ त्रिविक्रम
 सांघिविग्रहिक + + + सेनाध्यक्ष एतेषु
 स्थितेषु श्रीकरणविश्वनाथ महासेनापती गोत्रे अवधायितमुदल श्रीहस्तेन
 + + + देवरथाचार्याय भूमि +

Plate VI. reverse.

दत्तभू त्रिंशत् वाटीपरिमित भूमि निमित्तं अस्मिन् राज्ये त्रयोविंशत्यङ्के विक्का
 द्वितीय कृष्णसप्तमी पण्डितवा

(1) The following additions in B end the grant (B. VII. 18-23):—

क्षीराम्बुधिजैगति मङ्गलमातनोतु यत्र श्रिया कनककेतकपत्रकर्षणा ।
 स्त्रियः स्वपन्नुररिपुमुदितोज्ज्वलाभस्तोयं पिवन्नवघनस्तडितेव भाति ।
 जातः शम्भुशिरोधृतत्रिपथगावीचीषु हंसश्रियं विभ्रतस्य किलोदरे त्रिजगतीनेत्रोत्सव-
 स्रन्द्रमाः ।
 यो (यं?) कान्तिवितानवर्णननिभदासोपरं सोद्रधा कीर्त्ति दिक्षु विनिजैयन्निशि व्योमा-
 ज्जनं गाहते ।
 भूदेवस्त्रिवादस्वरयतु दुरितं निज्ज्वराः सन्तु सन्तः सन्तु प्रौढारिवीरव्रजविजयकला-
 शालिनः क्षौणिपालाः ।
 आस्ताद्विद्वच्चकोरश्महरणचमत्कारि काव्यं कवीणां सन्तु व्यामोहशान्तिः हृजतु हृदि मुदं
 विश्वतश्चन्द्रचूडः ॥ शुभमस्तु भूतजगतः ॥ ० ॥

रे देवकूटकटके श्रीचरणे पुजानवरे जपसमये पार्श्वे पात्र माहामुनिपुरोहित
 द्वारपरिच्छा त्रिविक्रम सन्धि
 विग्रह वुढालेङ्का सोमनाथ वाहिनीपति भितरभण्डारअधिकारी नरहरि
 संधिविग्रह थाउ पुरोश्रीकरण
 विश्वनाथ माहासेनापतिगोचरे अवधरित मुदले देवरथाचार्यकु आठखण्ड
 कोष्ठदेशमदनखण्ड विषये साइसो
 ग्रामार दचि(?)घरे दक्षिण राडसोओ ग्राम ए दुइ ग्राम शासन करी भूमि
 शए वाटि देवा । एसाहि मीनसंक्रान्ति कृष्ण एका
 दशी शनिवारे नारायणपुर कटके श्रीचरणे पुजा उत्तार विजेकरि आसिवा
 समये पार्श्वे वुढालेङ्का सोमना
 थ वाहिनीपति भुवनेश्वर संधिविग्रह लक्ष्मणानन्द संधिविग्रह भितरभण्डार
 अधिकारि नरहरि संधिविग्रह था
 उ द्वाचारपरिच्छा त्रिविक्रमसंधिविग्रह गोचरे अवधरित मुदले एमासि
 पुरोपरिच्छा माहापात्र गतेश्वर दास श्री-
 चन्दन आगे अव (ध) रित आजा वोइला मुदले देवरथाचार्यर साइस दक्षिण-
 राडसओ च (ए) दुइ ग्रा
 म कोष्ठदेश उग्रेश्वरदेवङ्कर देउली भूमि देउल मध्यकरि चतुःसीमा समाक्रान्त-
 शासनेक
 पटा देवा । ओडमोलोमदनखण्ड मध्ये साइसोग्राम ब्रीहिअवदान मध्य करि
 कोठव्यापा
 रर भाग तिनिस वाइस माठ ३२२ कै पुरोश्रीकरण विश्वनाथ माहा-
 सेनापतिर प
 डिहह (?) थ मठिनाएकर सीमा कला प्रमाणे एग्रामर पूर्वसीमा । भगवतीपुर
 शासनर पश्चिम चन्द्रप्र-
 भा दण्डा अधआदिकरि वांगरिसोग्रामर पुवकोण पोड़ापोड़ा पोखुरि
 द्विजल पर्यन्तकेसीमा । उ
 त्तरसीमा । वाङ्गरिसोग्रामर दक्षिण चिड़िचिड़ि वाटीर उतर दण्डार अध
 ब्राह्मण वाटीर तिसु-
 गडीगोपथ अधआदिकरि वाइङ्गणि नदी वा (? धा) इहं अधा सोइ पर्यन्तके
 सीमा । पश्चिमसीमा । राड

सञ्चो ग्रामर पुर(व) वाइङ्गणिनदीर अधा सोइ आदिकरि नइपारि गोपी
 नाथपूर शासनर नदी तड़ा
 आम्बतोटारे दक्षिणकोण कुचिआघाइर गोपथ अधपर्यन्तेके सीमा । दक्षिण-
 सीमा । गोपीनाथपूरर उतर हरागऊ
 अधाकरि भगवतीपूर शासनर गोपीनाथपूर शासनर तिसुण्डिगोपथर अधनइ
 उतर कूल पर्यन्तेके सीमा । गो चतुः
 सीमा समाक्रान्तग्रामेक । एविषयमध्ये राइसञ्चो त्रिहि सइका अवधान मध्यकरि
 मम्भि (?) घड़र पुरुसोत्तम प्रसाद नवरभा
 ग सएसताइस माठ १२७ कै एससीमा कलाप्रमाणे एग्रामर पूर्वसीमा । साइसो
 ग्रामर पश्चिम वाइङ्गणीआ नदी अधा
 सोइ आदिकरि देउलीभुमिर दक्षिण रक्तपटा दण्डा अधपर्यन्तेके सीमा ।
 उतरसीमा । देउलीभुमिर दक्षिण रक्तपटा दण्डा
 र अध आदिकरि वारोगोनइ अधासोइ पर्यन्तेके सीमा । पश्चिमसीमा । विजय-
 लक्ष्मीपुर शासनर पूर्व वारगो नदी अधा सोइ
 आदिकरि गोपीनाथपूर शासनर सुदुणाघाइ वंधतल गोपथ अध पर्यन्तेके
 सीमा । दक्षिण सीमा । गोपीनाथपूर शासनर उत
 र () ⁽¹⁾ नइकूलआम्बतोटार पश्चिम गोपथर अध वाइंगणिआ
 नइर अधा सोइ पर्यन्तेके सीमा ॥ गाचत्रुःसी-
 मासमाक्रान्तग्रामेक । एविषयमध्ये उग्रेश्वरदेवङ्गर देओलि अवधरितमुदल
 प्रमाणे भुमि त्रिस वाटि ३० कै एससीमा
 कला प्रमाणे एग्राम पूर्वसीमा वांगरिसो ग्रामर पश्चिम वाइङ्गनिआ नइ
 आदिकरि वालिआग्रामर पूर्व नइकुल
 गोपथ अधपर्यन्तेके सीमा । उतरसीमा । वालिआग्राम दक्षिण खेतमुण्डर
 वोहालदण्डा आदिकरि वारगो नदी-

Plate VII, obverse.

र अर्द्धपर्यन्तेके सीमा । पश्चिमसीमा । वि(ज)यलक्ष्मीपूर शासनरपर (?) वारगो
 नदीर अधासोइ आदिके सीमा ।
 दक्षिणसीमा । राठसोओग्रामर उतर रक्तपटा दण्डा अर्द्धपर्यन्ते सीमा । गा
 चतुःसीमा समाक्रान्तग्रामैक ॥

(1) The name of the river omitted and the space left blank.

गा ग्रामतिनिकि जित चिआरिस चालिस न माठ ४४६ भुमि तिरिसवाटिकि
चतुःसीमाक्रान्त यलस्थ (ल)

मक्ककूपपादपारणमध्यकरि आचन्द्रार्कथाइकरि देवरथ आचार्यकु देउल
उग्रेश्व(र) देला मध्यकरि

चतुःसीमाक्रान्त सासन दत पटाक ॥ आत्रेयसगोताय यजुंवे(दा)न्तर्गत काण्व
शाखैकदेशाध्याधिने देवरथ

शुम्भणे ब्राह्मणाय आत्रेयसगोत्रः श्रीमान् ओनरसिंह(ह) देववर्मा ओड़मोलो
मदनखण्डविषय मध्य (?) मध्या

सी यथालिखित चतुःसीमा समाक्रान्त स(ज)लस्थलमक्ककूपपादपा(र)ण्य
वालुकाभिटसहित साइसो ग्राम द

क्षिणराड़सओग्राम एतत्ग्रामद्वयं आचन्द्रार्कमकरीकृत्य प्रादात् ॥ शुभमस्तु ॥

अस्य शासनस्य साङ्गतया

ताम्राधिकारिणो नरहरि सनिविग्रहिकस्म । एतद्ग्राम महाज(न) भाग

व्यवस्थया ए काम

ए ताम्रलेखक गुरुदास सेनापतेः एतदङ्गं ।

Ancient Buddhist Statuettes and a Candēlla Copper-plate from the Bāndā District.—By VINCENT A. SMITH, I. C. S., and WILLIAM HOEY, D. LITT., I. C. S.

(With five plates.)

[Read June 1895.]

PART I.

The village on the south bank of the Jumna in the Pailānī Tahsīl of the Bāndā District in the North-Western Provinces, which is officially known as Icchāwar, and popularly as Nicchāwar, marks the site of one of the ancient towns of Bundēlkhand.

The ruins on the west side of the modern village are known by the name of Dhanēsar Khērā. Remains of a large building with a plastered floor are here traceable, and an image is venerated as Dhansir Dāi. The statue is that of a bearded man, seated on a cushion, with one leg drawn up, and wearing a cap and waistcloth, or short drawers. A sword hangs by his side. The long, flowing hair is coiled up behind over the shoulders. The ears are long, and adorned with earrings. The hands are folded, and seem to hold a casket. The same name, Dhansir Dāi, is applied to a group of figures, one male, and three female, at Pardāwā in the Mau Tahsīl of the same district. Pardāwā, we may note in passing, is an interesting site which would probably repay detailed examination.

The mounds about a mile south-east of Icchāwar are called Dhanī Khērā. The buildings there originally surrounded a considerable lake about thirty acres in extent, which is now dry. This lake is sometimes called the Bahi Tāl, and sometimes the Madan Sāgar. The latter name, which is also applied to the lake in the town of Mahoba, and is there a memorial of the powerful Candēlla king, Madana-varman, appears at Icchāwar to commemorate Madana-pāla-çarmman, the *sēnapati*, or general, of king Paramarddi-dēva, the grandson and successor of Madana-varman. This seems to be the natural inference from the fact that the copper-plate inscription recording the bestowal of the village Nandinī-grāma on the *sēnapati* was found in the ruins near the dry lake.

This inscription is recorded on two plates, which are now the property of Dr. Hoey. (Plate VII.) Each plate is about $13\frac{1}{4}$ inches long by $10\frac{1}{4}$ broad. The plates were formerly connected by a seal which has been lost. A hole for the attachment of the seal is pierced at the bottom of the first, and at the top of the second plate, so that the plates should lie back to back. Copper rivets, some of which still remain, were also inserted in the edges of each plate. These seem to have been intended to attach each plate separately to a wall, and were probably inserted after the loss of the seal.

The inscription on the first plate consists of 17 lines, of which the first four are interrupted in the middle by the insertion of a rude sketch of the four-armed goddess Lakṣmī, with an elephant on each side sprinkling her.¹ The date occurs in the thirteenth line. The last two lines are interrupted in the middle by the hole for the seal.

The inscription on the second plate consists of 18 lines, of which the first two are interrupted in the middle by the hole for the seal.

The characters are those usual in the Candēlla inscriptions of the period. The record, though not protected by raised edges to the plates, is in good preservation, and every letter is legible.

The purpose of the inscription is to record the gift, on the usual terms, of a village named Nandiṇī-grāma, in the district of Nandāvaṇa, to the *sēnapati*, Ṣrī Madana-pāla-ṣarmman, who is described as a Bhaṭṭa of Naugāva; a member of the Kṛṣṇātrēya *gōtra*, son of Ṭhakkura Ṣrī Mahēṣvara, grandson of Ṭhakkura Ṣrī Bhoṇapāla, and great grandson of Ṭhakkura Ṣrī Tihūṇapāla. The gift is recited to have been made at Ṣrī Bilāsa-pura on the fifteenth day of the bright half of the month Srāvaṇa, at the time of an eclipse of the moon, in the year 1228 (Vikrama), = A. D. 1177. The donor was *Parama bhaṭṭāraka, mahārājādhirāja, parameṣvara, paramamāheṣvara Ṣrī Kālāñjarādhīpati Ṣrīmat Paramarddi-dēva*, who was the successor of Madana-varmma-dēva, who was the successor of Prthivī-varmma-dēva.

The modern village, Nandan Dēo, a few miles distant from Dhanī Khērā where the copper-plates were found, probably represents the Nandiṇī-grāma of the inscription. It is visited by pilgrims, but Dr. Hoey had not an opportunity of inspecting the place and learning further particulars. Bilāsa-pura, where the grant was made, has not been identified.

The copper-plate now published is the fourth Candēlla inscription on copper known to exist. Two plates found at Nunaura (Nanyaura)

¹ The same device is inserted in the Augāsī copper-plate of Madana-varman, grandfather and immediate predecessor of Paramardi-dēva (*J. A. S., B., Vol. XLVII, Pt. I, p. 73*).

in the Hamīrpur District belong respectively to the reigns of Dēva-varmma-dēva (S. 1107) and Dhanga (S. 1055).¹ The third plate is a record of Madana-varmma-dēva, dated S. 1190.²

A fifth copper-plate inscription of the reign of Vīra-varmman, dated S. 1337, and known as the Dāhi copper-plate, which belonged to Colonel Ellis, was lost in the Mutiny.³

The numerous other inscriptions of the Candēlla kings are on stone.

Several inscriptions of the reign of Paramarddi-dēva are known.

A single line record on a pedestal at Mahoba, dated S. 1224, is mentioned by Cunningham, and seems to have contained the king's name. This inscription has not been published, and the original seems to have disappeared.⁴

The Mahoba inscription, dated S. 1240, certainly belongs to Paramarddi-dēva's reign, though his name has been lost.⁵

The Kālāñjar inscription, supposed to be dated in S. 1258, requires re-editing. It certainly mentions Paramarddi-dēva.

The Madanapur inscriptions record the fact of the conquest of Paramarddi by Pṛthivī Rāja Cāhumāna (Chauhan) in S. 1239, = A.D. 1182.

An inscription at Khajurāho dated S. 1234, and two at Ajaygarh, dated respectively 1237 and 1243, (Nos. 46 and 50 of Cunningham's list), belong to the reign of Paramarddi, though they do not seem to mention his name.⁶

The only inscription mentioning Paramarddi by name, and recorded during his reign, which has been properly edited, is the Bagrāri stone inscription.

"The proper object of the inscription is to record (in verses 25-29) that Sallakṣaṇa, the minister of the king Paramarddi-dēva built a temple of Viṣṇu, and a temple of Śiva at which the inscription was put up; and that this second temple was completed by Puruṣōttama, the son

¹ V. A. Smith and Bābū Prannath Paṇḍit in *J. As. Soc., Bengal*, Vol. XLVII, Part I (1878), p. 80.

² Rajēndralāla Mitra, *A copper-plate grant from Bāndā*; *ibid.* p. 73, Pl. VI.

³ Cunningham, *Archæol. Reports*, Vol. II, p. 455; Vol. XXI, No. 58, pp. 83, 87.

⁴ Cunningham, *Reports*, Vol. II, pp. 447, 448; Vol. XXI, No. 44, p. 82; V. A. Smith, *History of Bundelkhand*, *J. A. S., B.*, Vol. L, Part I (1881), p. 21.

⁵ *Ibid.*; *ibid.*

⁶ Madanpur is in the Lalitpur Subdivision of the Jhānsī District of the North-Western Provinces (*Arch. Rep.* Vol. X, p. 98, Pl. XXXII; Vol. XXI, p. 173).

The other inscriptions referred to are noticed in the works already cited. The king's name is written Paramarddi, or Paramardi. So the name Varma may be written as Varmma, or in the stem form as Varman.

of Sallakṣaṇa and his successor in the office of minister, after the death of his father.

And by way of introduction the inscription gives the genealogy of the king, and (in verses 14-24) that of his ministers. All that we learn regarding the former is that from Atri's eye sprang the moon, and from the moon the Candrātrēya princes; that one of them was Madana-varman, whose son was Yaçō-varman, whose son again was the ruling prince Paramardi-dēva."¹

This record alone informs us that Paramarddi, the Parmāl of tradition, although the immediate successor of the famous king Madana-varman, was yet the grandson, not the son, of that monarch. The order of regnal succession was certainly Pṛthivī-varman, Madana-varman, Paramarddi-varman, as given in the Icchāwar plate and the Ajaygarh stone inscription of Vīra-varman. The lost Dāhi copper-plate also gave the name of Madana-varman as that of Paramarddi-dēva's predecessor. It is evident that Yaçō-varman never reigned.

The bardic lists (*Arch. Rep.* II, 449) all insert a Kīrtti-varman between Madana and Paramardi. The words *Yaçō* and *Kīrtti* being synonymous, the entry in the lists is probably due to a reminiscence that Paramardi was the grandson of Madana-varman.

The latest known inscription of Madana-varman is dated S. 1220, =A.D. 1163. The earliest inscription of Paramardi is dated S. 1224, =A.D. 1167. It is, therefore safe to assume A.D. 1165 as the beginning of Paramardi's reign.

The Icchāwar inscription is dated S. 1228, =A.D. 1171. The reign of Paramardi ended in A.D. 1202, when he capitulated to Kutbud-dīn Ībak, dying before the surrender was effected. He was succeeded by Trailōkya-varman, who temporarily delivered his dominions from the Muḥammadan invaders.² Dr. Hoey possesses a unique copper coin of Trailōkya-varman, which we hope to publish soon.¹

¹ Kielhorn, *Baṭeśvar Stone Inscription of Paramardi-dēva*, (*Epigr. Ind.* Vol. I. p. 20). In a note the editor points out that the label attributing the stone to Baṭeṣvar in the Agra district seems to be wrong, and that the inscription is probably No. 52 of Cunningham's list (*Arch. Rep.* XXI. p. 82), which was found in two pieces on the bank of the lake at Bagrāri. There can be no doubt that the so called Baṭeṣvar inscription is really that found at Bagrāri, which like it had 24 lines, and was in two pieces. A Candēlla stone inscription could not have been found near Agra. Bagrāri is a village, in Bundēlkhaṇḍ. We have failed to discover its exact position.

² "Then the prince Trailōkya-varman ruled the kingdom, a very creator in providing strong places. Like Viṣṇu, he was, in lifting up the earth, immersed in the ocean formed by the streams of Turuṣkas." 1. 5 of *Ajaigarh Inscription of Vīra-varman* (*Epigr. Indica*, Vol. I. p. 329). Professor Kielhorn's excellent editions of several of the Candēlla inscriptions throw much light on the history of Bundēlkhaṇḍ, which requires to be revised.

PART II.

Three early brass statuettes of the Buddha found in the ruins of Dhanōsar Khērā to the west of Icchāwar, and purchased by Dr. Hoey, are of sufficient interest to deserve detailed description.

The material of the statuettes appears to be brass, though it may be the special alloy known as *ashṭadhātu*, or 'the eight metals.' "Copper was never very largely used in the fabrication of statuary, and bronze never, that alloy being held impure. Brass is more readily melted; it has a more attractive colour; it takes a finer polish, and is firmer, more malleable, less liable to rust, and more easily wrought than copper.

It has, therefore, been generally preferred as a material for ornamental figures. In the formation of the statues of gods, it is also very largely employed; but in such cases it is alloyed with small quantities of other metals, *viz.*, gold, silver, iron, tin, lead, and mercury; making with the copper and zinc of brass, eight; which is esteemed the purest alloy, and prized very highly as *ashṭadhātu*." ¹

The two larger statuettes (Nos. I and II) are inscribed; the smallest one (No. III) has no inscription.

The standing figure No. I (Plate VIII) is much the better executed of the two larger images, and possesses some merit as a work of art. It closely resembles many of the Gāndhāra sculptures, and, in our judgment, shows distinct traces of Hellenistic influence. Buddha stands in a preaching attitude, holding in his left hand a palm leaf or birch bark scroll. His right hand is open, and raised in admonition. His dress consists of a robe, open at the neck, covering both shoulders, and of an under garment, which appears below. This under garment appears to be a pair of wide drawers, such as are now called a "divided skirt," though it may possibly be an undivided skirt. The feet are bare. The head is covered with the hair arranged in a mat of conventional curls, gathered above into a top-knot. The earrings are long and heavy. The drapery is well executed, and the form of the body is well shown through the clothing. The hands are moulded with considerable skill; a large circular aureole is attached to a projection at the back of the head.

The figure stands on a well designed pedestal, which rests on four claws.

The principal dimensions are as follows:—

Height (including pedestal) to surface of top-knot	...	13''·625
Total height to top of aureole	...	14''·725

¹ Rājēndralāla Mītra, *Antiquities of Orissa*, Vol. I, p. 67.

Height of figure, from surface of pedestal to surface			
of top-knot ...	...	...	... 10''·50
Diameter of aureole ...	...	...	... 5''·75

The inscription consists of a single line of ancient Nāgarī characters incised on the convex moulding of the pedestal, and running round all four sides. The characters are in some respects peculiar in form, and a few of them are difficult to read, though well-preserved. They are of an early type, and, we should think, not later than A.D. 300. The facsimile, prepared from an inked *estampage*, (Plate IX) will enable the reader to form his own opinion as to their age. The convexity of the moulding, and the shallowness of the engraving cause some difficulty in obtaining a copy of the inscription, which reads as follows:—

*Dēyadharmōyaṃ upāsikā Bēdi—
kāyā yadatra punyaṃ
tad bhavatu mātā pitrō sarvva satvā—
nāṃ anuttara jñānavāptayē.*

“This is the meritorious gift of the female worshipper Bēdikāyā; whatever religious merit there is in it, let it be for the attainment of supreme knowledge by her father and mother, and by all sentient beings.”

This formula, with some slight modifications, is found in three of the later inscriptions in the caves at Kuḍā, forty-five miles south of Bombay.

The earliest inscriptions at Kuḍā, which may perhaps date from the first century B.C., are in the Pālī language and simply record that such and such an article is the gift (or “meritorious gift”) of so and so. The prayer that the merit of the gift may be for the attainment of supreme knowledge by the donor’s parents and all sentient creatures is wanting. That prayer is found in the later inscriptions, which, like those on Dr. Hoey’s statuettes, are in the Sanskrit language. The Buddhists of the earlier Hīnayāna sect used Pālī. The members of the later Mahāyāna sect used Sanskrit.

In order to show how closely the inscriptions on the statuettes follow the Kuḍā pattern, we quote No. 7 of the Kuḍā inscriptions:—

*Dēyadharmōyaṃ Ćākhyōpā—
sikā Vyāghrakāyā yad atra
punyaṃ tadbhavatu mātāpitṛpū—
rvvaṅgamaṃ kṛtvā sarvvasatvānāṃ anuttarajñā—
nāvāptayē.¹*

¹ The Kuḍā inscriptions are discussed by Dr. Burgess (assisted by Dr. Bühler) in Volume IV. of the *Archæological Survey of Western India*, ‘Report on the Bud-

The inscription of the statuette of the seated Buddha (No. II.) includes (excepting the word *kṛtvā*) the portion of the formula which has been omitted from the dedication of the standing image.

This second statuette, that of the seated Buddha (Plate X), is almost destitute of merit as a work of art, and is an ordinary Indian production of conventional pattern. Buddha is exhibited squatting, with the soles of his feet turned up, and holding the little finger of his left hand between the first finger and thumb of the right hand. The shoulders are square, and the general appearance of the image resembles that of mediæval Jain statues. But, unlike the Jain images, Buddha is not nude. He is clothed in close-fitting garments, the existence of which is indicated only by the opening for the neck, and the termination of the sleeves and drawers. No attempt is made to express the folds of the clothing. The hands are stiffly and clumsily moulded, and the face is expressionless. The æsthetic demerits of the work are so striking that, if it were not inscribed, a late date might be assigned to it. But the characters of the inscription, though somewhat later in form than those on the pedestal of the standing figure, are probably not later than A.D. 400, and certainly not later than A.D. 500.

A rectangular plate, surmounted by a circular aureole, is attached to a projection at the back of the head.

The principal dimensions are:—

Height, including pedestal, to surface of top-knot	...	12''·50
Total height to top of aureole	... ...	... 14''·00
Height of figure, from surface of pedestal to surface of top-knot	... ... ...	... 9''·50
Diameter of aureole	... ...	... 5''·40

The inscription is in two lines on the front moulding only of the pedestal. (Plate IX.) Some of the letters are difficult to read, and a few are to us doubtful. The record is as follows, subject, perhaps, to some slight correction.

¹ *Deyadharmōyaṃ Guptavaṃśōdita Śrī Haridāssya rajñī Mahādēvyāḥ yadatra puṇyaṃ tad bhavatu.*

² *Sarva satvānāṃ mātā pitṛ pūrvāṅgamaṇaṃ anuttarapada jñānārāptayē.*

dhist Cave Temples and their Inscriptions. (London, 1883) pp. 12–14, 85, 86; Plates XLV, XLVI. Nos. 7, 8, 9 of Plate XLV. resemble the dedications of the statuettes in language, and to a large extent in alphabetical characters. They are supposed to date from the fifth or sixth century A.D. The Mathurā inscription of the Gupta year 135 (A.D. 453) has the formula *Dēyadharmōyaṃ vīhārasvaminīyā Dēvtāyā yadatra puṇyaṃ tad bhavatu mātāpitṛōḥ sarvasattvānāṃ anuttarajñānārāptayē.* (*Fleet*, p. 263.)

This seems to mean that the donor was Mahādēvī, the wife, or queen, of Ārī Haridāsa of the Gupta race. The name Haridāsa, with the cerebral *ḍ*, is curious, but it seems impossible to read the name otherwise. Many of the characters, especially those in the second line, are very rudely incised, and imperfectly formed.

The epithet *Guptavaṃṣōdita*, 'sprung from the Gupta race,' or the 'race of Gupta,' is interesting. It apparently means that the donor was a member of the family of the sovereigns of the great Gupta dynasty. The words *Guptavaṃṣa* are most naturally translated, 'the race of Gupta,' that is to say the race of which Gupta was the progenitor. Sir Alexander Cunningham to the last (*Coins of Med. India*, p. 9) believed that the word Gupta as a proper name could not stand alone, because it was impossible that a past participle meaning 'protected' could itself be treated as a name without mention of the protecting deity. The citation by Drs. Fleet and Bühler of the names Upagupta and Upaguptā failed to change Cunningham's opinion. The dedication on the statuette is a strong confirmation of the view that the name of the progenitor of the famous dynasty was simply 'Gupta,' i.e., 'protected' [by the gods], and not 'Ārī Gupta,' 'protected by Lakṣmī.'

Several of the published inscriptions use Gupta as a family name in the phrase *Guptanṛparājyabhuktau* (*Fleet*, p. 102, etc.), 'during the enjoyment of sovereignty by the Gupta kings.' So the Gīrnār inscription speaks of the 'Gupta era' (*Guptaparakāla*), and the Mōrbī inscription uses the adjective *Gaupta*. (Bühler, *on the Origin of the Gupta-Valabhi Era*, pp. 6-9.)

The English phrases 'Gupta dynasty' and 'Gupta era' are thus fully justified by Sanskrit precedent. The third statuette (No. III) is very small, about $4\frac{1}{2}$ inches high, and has no pedestal. Probably a pedestal existed, which has been lost. The stand shown in the photograph (Plate XI) is a wooden one made by the owner. The aureole, of which the upper part is broken off, is arranged as an oval shield the full length of the figure. The right hand is lost. The drapery is arranged like that of the large standing figure No. I, though the attitude slightly differs. The artistic execution, though better than that of No. II, is inferior to that of No. I.

A suggestion for the second edition of Mr. Blochmann's Āin.—By ANNETTE S. BEVERIDGE (Communicated by the PHILOLOGICAL SECRETARY).

[Read, March 1895.]

Having had occasion to distinguish amongst the various *Mīraks* of Akbar's time, I have, in Mr. Blochmann's index, come across *emendanda* under the head *Mīrak*, which moreover, for clearness' sake, render some slight modifications in the text desirable. Mr. Beveridge has been so kind, by reference to the Persian, as to verify the doubts which I had gathered from the translations.

Amongst the seven entries of *Mīrak* in the index, I find that three seem to refer to the same man. One *Mīrak* is omitted and him too, I identify with the thrice-entered *amīr*.

The three first named are :—

1. *Mīrak Khān Arghūn*, 475 ¹ (No. 208).
2. *Mīrak Khān*, 439.
3. *Mīrak Khān Bahādur*, 532.

The omission is :—

4. *Mīrak Khān Jinkjank* (?) 531.

The first and third of these are separately entered by a mere slip, for they refer, respectively, to the biographical notice of *Mīrak Arghūn* and to his name in the combined *Ṭabaqāt* and *Āin* lists of the *amīrs*.

It is equally clear that the second and fourth names denote one individual. Turning to page 439, we find Mr. Blochmann warning us against confounding Rawazī *Khān*, *Mīrzā Mīrak* “with *Mīrak Khān* or with *Mīrak Bahādur* (208).” He writes as follows :—(*Mīrak Khān*) “an old grandee who died in 975.” (*Ṭabaqāt*.) ²

The words quoted are used in the original (Lakhnau edition, 385) about *Mīrak Khān Jinkjank* (*Kinhak* or *Kinjak*). So far as we have been able to trace, this is the only mention of *Jinkjank* or its approximate readings. Apparently then, Mr. Blochmann's *Mīrak Khān* (p. 439) is

¹ All references are to Mr. Blochmann's *Āin*, unless otherwise assigned.

² The word “*Ṭabaqāt*” is quoted by me from Blochmann.

the *Jinkjank* of Nizām's list (No. 99). All that is needed to make this clear in the text is to give the full name Mīrak Khān Jinkjank (?) as found at the place from which the quotation ("an old grandee, etc.") is taken.

The next point to which attention is to be given is the identification of *Jinkjank* with *Arghūn*.

We know that the former died in 975 H., the year of Citōr. We know that the latter was killed in 975 H., in an explosion before Citōr (Mr. Blochmann's *Āīn*, 532, n. 2). This fact is recorded of No. 208 both in the *Ṭabaqāt* and by Abū-l-faḍl. It would be a curious coincidence for two *amīrs* named Mīrak to die in the same year, but this might be so. It is, however, improbable that one of these, being, as Nizāmu-d-dīn says, "an old grandee" should not be mentioned in the detailed stories of any of the contemporary writers, beyond the bare record of his death in the *Ṭabaqāt*. This is the more improbable that he was a man of position sufficient to bring him into Nizām's list. Of Mīrak Arghūn some facts as to service are set down in the biographical notice and he is named honourably amongst the grandees told off to Māl-wā in the sixth year.¹

Now there is no mention of "*Jinkjank*" in the *Āīn* list (531, No. 99), and curiously enough, the Lakhnau *Ṭabaqāt* does not give Mr. Blochmann's No. 115, Mīrak Khān Bahādur."² Perhaps some one having access to other editions of the *Ṭabaqāt* would be so kind as to look up this point and thus add to, or detract from the probability of the identification which now seems reasonable, *i.e.*, that of *Jinkjank* with *Arghūn*. It would also be useful and perhaps decisive if some understanding could be arrived at as to the word *Jinkjank* to which Mr. Blochmann appends a question mark and which the Lakhnau edition gives as *Kinhak* or *Kinjak*.³

Even with the knowledge available now, the identification appears reasonable. A double entry is not unknown elsewhere in Nizām's list;—Mr. Blochmann points out that of Mu. Qāsim Khān.

Pending possible correction on the points, (1) the omission of

¹ The record of Arghūn's death has not yet found its legitimate place in his biography but awaits, in a note, the second edition.

² Similarly "No. 116, Shāh Mu. Qalātī" is not in the Lakhnau *Ṭabaqāt*. The omission of a man so distinguished as Qalātī, points to a printing error, especially as he is not to be found in duplicate in Nizām's list.

³ Since writing these notes, I have learned from Mr. Beveridge that the British Museum MS., No. 29, 209, Vol. II, p. 52, b. gives the word which in other MS. or published editions has been read as Jinkjank, Kinhak, or Kinjak quite clearly as *Jujak* میرک خان جُجَک (Mīrak Khān Jujak).

No. 115 in the Lakhnau *Tabaqāt*, and (2) the meaning of *Jinkjank*, I venture to suggest that the index may, under the head *Mīrak*, read in a second edition of Mr. Blochmann's *Āin*, as follows :—

1. Mīrak Khān Bahādur Arghūn (*Jinkjank* ?) 429, 439, 475 (No. 208), 531, 532.

N. B.—The references to pages 429 and 531 are omitted in the existing index.

2. Mīrak Jalair, 521.

3. Mīrak Khwājah, 525.

4. Mīrak Khwājah, Chengiz Khān, 442.

5. Mīrak Mīrzā, Rawazī Khān, 438 (No. 141).

If it is justifiable to identify *Jinkjank* with *Arghūn* a slight change will follow in the text, where at page 439 and in line 15, “*or with*” should read “*that is*.” The insertion of *Arghūn* after the name *Mīrak* on pages 429, 439, 531 and 532 would be useful to readers.

Notes concerning Khawājah Muḥammad Muqīm Harawī, the father of Nizāmu-d-dīn Aḥmad Bakhshī.—By ANNETTE S. BEVERIDGE
(Communicated by the PHILOLOGICAL SECRETARY).

[Read, March 1895.]

As everything relating to the author of the *Tabaqāt* possesses interest, I venture to ask permission to “hang up” in the critical air of the *Journal* of the Asiatic Society of Bengal,—for confirmation or disproof,—a suggestion about the record of his father’s life which, if verified, will be of use in a second edition of Mr. Blochmann’s *Āin*.

It appears to me that *there is good ground for believing* “*Khawājah Muqīm, the son of Mīrakī*” (525, No. 401), *to be the father of Nizāmu-d-dīn, Khawājah Muḥammad Muqīm Harawī*.¹

The considerations which seem to me to support my suggestion are as follows:—

(a) Mr. Blochmann, basing his statement on the *Akbarnāmah*, says that *Khawājah Muqīm* (No. 401), the son of *Mīrakī*, was made a *bakhshī* in 999 H.

Abū-l-faḥl names *Muqīm* of *Khurāsān* in his list of *bakhshīs* (528), and Mr. Blochmann identifies this man with the “son of *Mīrakī*” by prefixing “No. 401” to his name, in this list.

Nizāmu-d-dīn says when speaking of the appointment of the *bakhshī* of 999 H. (*Tabaqāt*, Lakhnau ed., 374) “They appointed *Khawājah Mu. Muqīm*, an old family servant and who had been brought up in this Court, (*khānazād*) to the office of *bakhshī* of the army.”

Of all the *Muqīms* of this period, there is mentioned in the various sources—so far as I have been able to trace—one man only who answers to the description given by Abū-l-faḥl and *Nizāmu-d-dīn Aḥmad* of the *bakhshī* of 999 H., as being at once, a *Khurāsānī*, an old servant,

¹ All page references are to Mr. Blochmann’s *Āin* unless otherwise assigned.

For all the many references to the Persian which these notes have required. I am indebted to Mr. Beveridge, as well as for counsel, and the multiform help which comes from discussion of “points.” For all errors, I only am responsible.

a *khānazād*, and as bearing the names Muḥammad Muqīm and the title *Khwājah*. This is the father of Nizām,—*Khwājah* Mu. Muqīm Harawī.¹

The various Muqīms of this time are as follows :—

1. Shujā'at Khān, Muqīm-i-'Arab. A Turkistānī, and died in 988 H.
2. Muqīm Khān, son of Shujā'at Khān. A Turkistānī and, early under Akbar, a Commander of 500.
3. Mīrzā Mu. Muqīm, the son of Mīrzā Zulnūn, and by marriage a cousin of the Emperor Bābar.
4. Muqīm Naqshbandī. Defeated and slain in Gujrāt, in 983 H.
5. Muqīm a "Commander of Five Hundred, 100 horse ;"—a relation of Āṣaf Khān III. Ja'far Bēg Qazwīnī (413), (*Pādīshāhnāmah*, I, part 2, 328). The word which Mr. Blochmann renders "relation" is *khwēsh*. I can find nothing to decide whether Muqīm was a blood-relation and therefore perhaps a Qazwīnī, or a son-in-law of Ja'far Bēg. So that on the ground of descent there is, so far, nothing to prevent him from being No. 401. He is called *Shāhjāhānī* in Mr. Blochmann's index. If this implies that his best days were lived under *Shāhjāhān*, it makes, to some slight extent, against his being the *bakhshī* of 999 H., the said *bakhshī* being an old servant in 999 H. and the year of *Shāhjāhān*'s accession being 1037 H. Very little, however, can be built on the consideration that No. 401 would have been an old man in 1037 H., for some of the *amīrs* of these days rivalled modern statesmen in their sustained capacity for holding office. Perhaps some student of the sources for *Shāhjāhān*'s reign could tell something about this Muqīm.
6. *Khwājah* Muḥammad Muqīm Harawī (420, 421). A Khurāsānī, a servant of Bābar, Humāyūn and Akbar ;—and possibly a *khānazād*²—at any rate young in the service of Bābar.
7. *Khwājah* Muḥammad Muqīm, the son of Mīrakī (525, No. 401). A Khurāsānī, an old servant of the State in 999 H.—and a *khānazād*. He was a Commander of Two Hundred.

(b) To entitle Muqīm *Bakhshī* to be called an old servant of the State in 999 H., he must have been a contemporary of Harawī for, at the least, the greater part of the 36 years of Akbar's reign antecedent to his appointment. If my suggestion that the Harawī of the earlier chronicling is the Muqīm *Bakhshī* of later record, be wrong, some curious coincidences must be faced. Both these men (supposing they were two), were Khurāsānīs ;—Muqīm *Bakhshī* was a *khānazād*, Harawī was a dependent of Bābar (Elliot V, 178) if not literally a *khānazād* ;—both bore the names Muḥammad Muqīm and the title *Khwājah*.³

¹ Harāt was until recently, the capital of Khurāsān. (Gazetteer of India.)

² The grounds for this are briefly indicated later on, in these notes (para. (f).)

³ Mīr Ma'sūm of Bhakkar calls Muqīm *Bakhshī* indifferently *Khwājah* and *Khān*, but I cannot find that the latter rank was ever bestowed on him. He seems to have ended his career as a leader of Two Hundred.

Their records do not overlap and they never appear on the scene together. Harawī vanishes from the record in 981 H., Mīrakī appears in 988 H. Moreover—and this is certainly a consideration of much weight—both men filled similar or identical offices. Harawī was a *dīwān*, a *vazīr*, an *amīn*: the son of Mīrakī an *amīn*, a *wāqī'ah nawīs*, a *bakhshī* and a *dīwān*. That there should have been two contemporaries, so alike in circumstance and whose character and rank fitted them to fill the same class of appointments would certainly be singular.

(c) Two questions present themselves which contribute something in favour of my suggestion. The record of the “old servant,” Muqīm *Bakhshī* begins in 998 H. What was his past?

The most important office named as filled by Harawī under Akbar was that of *amīn* in Sindh, in 981 H. What were the “high offices” which the *Maāṣir* tells us, he held under Akbar? (Elliot V, 178. *Maāṣir* under Muqīm's name.)

(d) I have emphasized the fact that the two men bore the same names and title and it should now be noticed that more weight might be due to the conjunction of “Muḥammad” with “Muqīm,” if any other Muqīm of this time could be found bearing any other second name than Muḥammad! ‘Abū-l-faḍl names them all, short,—Muqīm;—Jahāngīr does the same; so too Bābar. Nizām¹ gives the Muḥammad to three—those to whom I have given it.

(e) It is a slight contribution in favour of my suggestion, perhaps, that the index to the *Akbarnāmah* (Bib. Ind.) places all the incidents which concern both Harawī and the “son of Mīrakī,” under the heading, “Muqīm *Bakhshī*.” The maker of the index must have possessed some guiding clue for this arrangement, as well as for the omission under this heading, of scattered incidents which concern other Muqīms.

(f) A lengthened search has yielded no information about the Mīrakī who is set down as the father of Muqīm *Bakhshī* (525).²

Possibly the word *Mīrakī* may not be a name, but may imply that Muqīm's father held a petty office. If so, this would give fuller meaning to the epithet “*khānazād*” applied to the *Bakhshī* by Nizām and might indicate that like Nizām (who speaks of himself as a *khānazād*) the “son of *Mīrakī*” was born in the royal service. This would—granting the correctness of my suggestion,—explain how it was that Harawī entered Bābar's service so young and was called a “dependent.”

¹ The passages in which he names his father in full are to be found in the *Tabaqāt* (Lakhnau ed. preface, and at page 374).

² The results of this search are published above, pp. 163 & ff.

If my suggestion survives examination, the biographical notice of No. 401 (525) should include, at least the following items:—

Khawājah Muḥammad Muqīm of *Khurāsān* (*Harawī*.) Son of *Kh. Mīrakī*. Descendant of the great saint of *Harāt*, *Kh. ‘Abdullah ‘Anṣarī* (*Ṭabaqāt*, Erskine’s MS., British Museum. Rieu’s Catalogue, 1,220). Brother-in-law of *Sultān Ibrāhīm Aubahī*. (435, 533.) Father of *Nizāmu-d-dīn Aḥmad*, the author of the *Ṭabaqāt*. Brought up in *Bābar*’s household;—employed in the *Dīwānī-i-buyūtāt* of *Bābar*;—instrumental in securing the succession to *Humāyūn* by repeating to *Mīr Khalīfah*, the threat uttered by *Mahdī Khawājah* against him, just before the death of *Bābar* (*Ṭabaqāt*, Lakhnau ed. 374);—*vazīr* to ‘*Askarī* in *Gujrāt* 941 H.;—at *Chaunsa* with ‘*Askarī*, and one of the few troopers who escaped with *Humāyūn* to *Āgrā*, 946 H.;—at *Kanauj* with ‘*Askarī*, 947 H.;—*Nizām* born about 953 H.;—employed in “Government” business in *Āgrā*, 974 H. (Elliot V. 317)—an *amīn* near *Bhakkar* and counselling loyalty to the son of *Mīr Khalīfah*, *Muḥibb ‘Alī*, 981 H.;—with ‘*Azīz Kōkah* in *Bengal* 988 H.;—returns to Court with ‘*Azīz*, 991 H.;—in *Bengal* as *amīn* and *wāqī‘ah navīs* and shut up in *Ghōrāghāt* with *Tāhir Saifu-l-mulūk* 992 H. (*Abū-l-faḥl* speaks of him as a “jewel of sagacity and courage” at this point);—*bakhshī* to the armies of *Ṣadiq Khān Harawī* and *Ismā‘īl Qulī Khān* in *Multān*, 994 H.;—*bakhshī* to ‘*Abdu-r-rahīm Khān-khānān* in *Sindh*, 999 H.;—*dīwān* of *Multān* and commissioned to forward to Court the reports of his eleven colleagues—*dīwāns* of the Empire, 1003 H.;—death of *Nizām* 1003 H.*

The term of life necessary to cover the events recapitulated in this tentative biographical notice, is not beyond the bounds of probability and is far from being unexampled amongst the contemporaries of *Muqīm Bakhshī*. ‘*Azīz Kōkah* died at 84, having been made *atālīq* to Prince *Dāwar Bakhsh* when 83. *Mihtar Khān* lived to be 84 and died holding a Command of Three Thousand. *Mīrān Ṣadr Jahān Muftī* died in 1020 H., and was believed to be 120 years old. *Jahāngīr* promoted him to be a *Chahār-hazārī*, twenty years or thereabouts before his death. *Muḥibb ‘Alī* was a fighting man under *Bābar* and died in 989 H. *Peshrau Khān* was, according to *Jahāngīr*, an excellent servant and smarter than many a young man, at the age of 90.

* Elliot says (V. 178) that *Harawī* is spoken of in *Bābar*’s Memoirs. If so, his name has escaped a thrice-repeated search through the Memoirs. A *Muqīm* figures there frequently, but this is the son of *Mīrzā Zalnūn* and son-in-law of *Mīrzā Ulugh Bēg*, *Bābar*’s cousin. In a supplemental chapter (Memoirs of *Bābar*, 428) Mr. Erskine relates the story of *Mahdī Khawājah* and *Muqīm Harawī*. It is interesting to find that at the time he quoted the welcome passage, he did not know the *Ṭabaqāt*.

The first fixed date in Muqīm Harawī's life is *Jumāda* I. 974 H. (1530). Its last is 1003 H. (1594), a period of 64 years. Of the date of his death, I know nothing; Nizām rarely names his father, as such, and does not chronicle his own joys and sorrows, so that nothing certain can be gathered from his silence.

There are indications—too slight to carry weight without a long criticism of the story of Mahdī Khwājah's threat against Mir Khalīfah—which point to Harawī's being a young man at the time it concerns, *viz.* 974H. If the story had been written down in or near 974 H., there must have been set against these indications of youth, those of adult wisdom contained in the advice offered by Harawī when he reported to Mir Khalīfah the threat against him which he had overheard from the mouth of the Khwājah. But the record is of much later date, and was made when Harawī and Nizām were both grave men. Possibly the wisdom is a reflection of maturer years; it was certainly not needed as an argument against Mahdī's succession by the man he threatened and in whose power it lay to raise him to the throne or—as was done—to pass him by. One doubts too, if any *dīwān-i-buyūtāt*—whatever the number of his years—would have ventured to argue with the “pillar of Bābar's Empire” as to anything he had proposed to himself to do, but even the youngest servant might have reported a speech which betokened treachery to one of his master, Bābar's, most trusted adherents.

Summing up the points as to Muqīm Harawī's age, it seems to me that if he did not long survive 1003 H. and was a young man in 974 H. his whole career may well have been one of under ninety years.



Mogul Copper Coins.—By C. J. RODGERS, *Honorary Numismatist to the Government of India*.

With twelve plates.

[Read July, 1895.]

I have already written three papers on the Copper Coins of Akbar, two in this *Journal* and one in the *Indian Antiquary*. In the Indian Museum are many coins of Akbar and of other Mogul Emperors. There is a vast collection of Mogul Copper Coins in the Lahore Museum. The catalogues of the coins in these two museums are ready and can be studied.

Mr. Stanley Lane Poole in the preface to the British Museum Catalogue of Mogul Coins says, "The rarest of all Mogul Coins are those of copper." This sentence should read, "The rarest of all Mogul Coins, *in the British Museum*, are those of copper." It was a mistake to regard the British Museum Mogul Coins as a representative collection. It had in it forty copper coins only. Now my papers should have given an inkling as to the numbers of Mogul Copper Coins obtainable. My catalogue of the Lahore Museum coins (purchased from me by the Panjab Government) shows how numerous the copper coins of many Mogul Emperors are. The truth is that these copper Mogul coins are so uncouth in shape and the legends on them are so fragmentary, that numismatists have neglected them and collectors have despised them. But of late some kind and sensible correspondents of mine have paid attention to them. I live in the Panjab, and as I get no pay I cannot go about hunting for coins in other provinces. But the Rev. Geo. P. Taylor, D.D., of Aḥmadābād, R. F. Malabarwala, Esq., and C. E. Kotwal, Esq., of Bombay, Major Adam Smith of Poonah, and the Rev. J. E. Tracy, M.A., of Kodaikanal, Madura District, have kindly sent up to me some of the results of their research, and the consequence has been that with their aid and with the assistance of the Amritsar bazaar, I have been able to put together the drawings in the accompanying twelve plates. The coins are therein arranged in no special order, but

were drawn as they came into my hands. As some few copper of Jahāngīr in the Lahore Museum seemed rare if not unique, I obtained permission from the curator to draw them. Ten years ago in Simla, I drew two coins of Shāh Jahān that were in General Cunningham's collection. These are 22 and 23 of Plate XIII.

It will be seen that the coins of Aḥmadābād are very fully shown. Nearly all these are the results of Dr. Taylor's research. One coin No. 144 of Pl. XXIII, was obtained by me the day on which I finished that plate. So that it will be seen the plates represent the result of united labour. I heartily thank my fellow workers for their help. Without it I could not possibly have produced this paper.

I will now go through the coins and transcribe, as far as I can, the legends on them.

PLATE XII.

(1) *	اکبر شاہی (چ) و تانکے	Akbar <u>Shāhī</u> Four Tānkē piece	امرداد (الہ) ۵۰ احمد اباد	Amardād month Aḥmadābād 50th
			ضرب	year.
(2)	(۱) اکبر (شاہ) (چو) تانکے	do.	شہر یور (الہ) ۴۹ احمد اباد	Shahrēwar month Aḥmadābād 49th
			ضرب	year.
(3)	شا (۸) سلیم (د) و تانکے	<u>Shāh Salīmī</u> Two Tānke piece	— — — (الہ) احمد اباد	.....month Aḥmadābād ...
			ضرب	year.
(4)		do.	اذر الہ	Azr month
	شا (۸) سلیم (چ) و تانکے	Four Tānkē piece	۵ (۰) احمد اباد	Aḥmadābād 50th
			ضرب	year.
(5)	اکبر شا (ہم) (چو) تانکے	Akbar <u>Shāhī</u> Four Tānkē piece	تیر (الہ) ۴۹ احمد اباد	Tīr month Aḥmadābād 49th
			ضرب	year.

* The weights are given under the coins on the plate. M. = Mr. Malabarwalla : TA. = The Rev. Geo. P. Taylor, D.D. : K. = Mr. Kotwal : A. C. = General Sir Alexander Cunningham : L. M. = Lahore Museum : A. S. B. = Asiatic Society of Bengal ; C. J. R. = Author : TR. = Rev. J. E. Tracy, M.A.

(6)	تَنكہ اکبر شاہی ضرب احمد آباد (نیم)	(Half) Tanka of Akbar Aḥmadābād	۴۶ الھ آبان	44th year Ābān month.
(7)	تَنكہ اکبر شاہی ضرب احمد آباد	Tanka of Akbar Aḥmadābād	۴۶ الھ اردی بہشت	46th year Ardībihisht month
(8)	تَنكہ اکبر شاہی ضرب احمد آباد چہارم حصہ	$\frac{1}{4}$ Tanka of Akbar Aḥmadābād	۴۵ (۱ الھ) تیر	45th year. Tīr month.
(9)	————— احمد آباد ہشتم حصہ	($\frac{1}{8}$ th Tanka of Akbar) Aḥmadābād	————— تیر	— — — — Tīr month.
(10)	اکبر شاہی دو تانکے	Akbar Shāhī Two Tānkē piece	(۱) ردي الھ ۴ احمد آباد	Ardībihisht month Aḥmadābād.
(11)	روا (نے) ۲ سنہ	Rawānē 2nd year of Jahāngīr	احمد آباد س فلو ۱۰۱۶	Aḥmadābād Fulūs 1016 H.
(12)	روا (نے) ۶ — — —	do. 6th year of Jahāngīr	This side was like (11) but year ۱۰۱۹	1019 H.
(13)	روا (نے) — —	do. No year	as on (11) no year Fulūs.	Aḥmadābād

PLATE XIII.

(14)	جہانگیر فلوس سنہ ۸	Jahāngirī Fulūs, 8th year	آگرہ ضرب ۱۰۲۲ سنہ	Āgra 1022 H.
(15)	ابوالمظفر — — — — فلوس ...	Part of legend on dām of Islām Shāh Sūrī	Part of legend on (14) and part of legend on reverse of Islām Shāh Sūrī.	

(16)	روان ۴ سنه	Rawānē 4th year of Jahāngīr	بیروات ضرب	Bairāt.
(17)	شد روان	It became Rawān (current)	۱۰۲۲ قندهار فلوس	Qandahār Fulūs 1022.
(18)	جهانگیر ۲ عدل	Jahāngīrī, 6th year 'Adl	کابل فلوس	Kābul Fulūs.
(19)	جهانگیر روان ۹	Jahāngīrī Rawān, 9th year	اجمیر ضرب ۱۰۲۴ سنه	Ajmīr 1024 H.
(20)	۴ سته رایج	4th year Rāj (Current)	۱۰۱۸ سنه ضرب آگره	1018 H. Āgra.
(21)	نیم رایج	Half a Rāj	دهلی ضرب	Dehlī.
(22)	شاه جهان فلوس ۲۹	Shāhjahānī Fulūs, 29th year	سنه ۱۰۶۵ هجری بیروات ضرب	1065 Hijrī Bairāt.
(23)	شاه جهان فلوس	do., no year	۱۶ سنه پتنه ضرب	16th year Patna.
(24)	اورنگ شاهي فلوس	Aurangshāhī Fulūs	ملتان (ضوب) ۱۰۷۳	Multān 1073 H.
(25)	سنه مبارک جلوس	Year Blessed of accession	لاهور ضرب (۱۰)۷۵	Lāhōr (10) 75 H.

PLATE XIV.

(26)	شاه جهان فلوس	As on (23)	آبان ماه اله احمد آباد ضرب ۱۰۴۲	Abān month Aḥmadābād 1042 H.
(27)	do.	do.	ماه مهو اله احمد آباد ۱۰۴۱	Mihr month Aḥmadābād 1041 H.
(28)	do.	do.	مهر ماه اله (ضرب) ب احمد آباد	Mihr month Aḥmadābād no year.
(29)	شاه جهان فلوس ۶	Shāhjahānī Fulūs, 6th year.	اسفندارمز ضرب احمد آباد	Isfandārmuz Aḥmadābād no year.
(30)	شاه جهان فلوس ۱۰	Shāhjahānī Fulūs, 10th year	احمد آباد (ضرب) ۱۰۴۶	Aḥmadābād 1046 H.
(31)	اکبر شاه ۱۲۳۳ فلوس	Akbar Shāh II. 1233 H. Fulūs.	۱۲ جلوس سنه احمد آباد	12th year Aḥmadābād.
(32)	جهانگیر فلوس ۱۵	Jahāngīrī Fulūs, 15th year.	سورت ضرب سنه ۱۰۲۸	Sūrat 1028 H.
(33)	شاه جهان فلوس	Shāhjahānī Fulūs.	سورت ۲۸ سنه ضرب	Sūrat 28th year.
(34)	do.	do.	do., year ۱۶	Sūrat 16th year
(35)	(رفیع الدرجات ت فلوس)	Rafī'u-d-darajāt (Fulūs.)	۱۵ سنه جلوس ضرب	1st year no mint (probably Sūrat.)

(36)	محمد شاه شاه فلوس باد ۱۱۳۲ جهانگیر	Fulūs of Muḥam- mad Shāh Bād- shāh, 1132. Jahāngīrī	سنه جلوس ضرب سورت سنه اودیپور ضرب	year — Sūrat. year — Ūdaipūr.
(37)	شاه جهانگیر	Shāhjahānī	اجین ضرب	Ujain.
(38)	شاه جهانگیر	Shāhjahānī	اجین ضرب	Ujain.

PLATE XV.

(39)	۱۰۸۴ سنه شاه جهان اباد ضرب	1084 H. Shāhjahānābād	۱۷ سنه مبارک جلوس	17th year.
(40)	— — ۷۸ rest as on (39)	1078 H. Shāhjahānābād	۱۱ سنه rest as on (37)	11th year.
(41)	عالم گیر (زبب) شاه فلوس ۱۱۰۷ او (ر) نگ	Fulūs of Aurangzēb Shāh 'Ālamgīr 1007 H.	_____	_____
(42)	عالم گیر ۱۱۰۷ نگ — — —	as on (41), but less	_____	_____
(43)	عالم گیر شاه (۸) (فلوس) ۱۱۰۸ او (ر) نگ	as on (41), but year 1108 H.	_____	_____
(44)	_____	_____	ملتان ضرب جلوس مبارک ۴۰	Multān. 40th year.

(45)	سنه نار نول ضرب	Year— Nārnōl	سنه مبارک جلوس	Blessed year— of accession.
(46)	do.	do.	do.	do.
(47)	سنه دندار ضرب	Year <hr/>	do.	do.
(48)	do.	do	do.	do.
(49)	سورت ضرب سنه —	Sūrat Year—	اورنگ (شاه) ۱۰۸۳ فلوس	Aurangshāhī Fulūs 1083 H.
(50)	حید (ر) اباد سنه ۱۱۰۸	Haidarābād 1108 H.	مبارک جلوس ۴۱	Blessed year 41 of accession.
(51)	۱۱۱۳ ضرب	mint not read 1113 H.	مبارک جلوس ۴۵	Blessed year 45 of accession.
(52)	فلوس ایلچپور	Fulūs of Ēliepūr, 2nd year	باد شاه شاه عالم ۱۱۲۰	Bādshāh Shāh 'Ālam 1120 H.

 PLATE XVI.

(53)	عالم گیر مبارک جلوس	The blessed accession of 'Ālamgīr	۳۰ سنه بشولا پور ضرب	30th year Shōlāpūr.
(54)	عالم شاه مبارک جلوس	The blessed accession of Shāh 'Ālam I	۵ سنه شولا پور ضرب	5th year Shōlāpūr.
(55)	do.	do.	do.	do.
(56)	as on (53)		سنه کلببرگه ضرب	year— Gulburga.
	اورنگ زیب (۱۰۸۳ شاه) فلوس	Fulūs of Aurangzēb (Shāh) 1083	۱۵ سورت ضرب سنه	Sūrat 15th year.

(58)	۱۴ سنه مبارک جلوس	14th year of the Blessed Accession	سنه سورت ضرب	year Sūrat.
(59)	زیب اورنگ _____هـ شا	Aurangzēb Shāhī	سوورت سنه ۴ ضرب	Sūrat 4th year.
(60)	اورنگ (زیب) _____هـ فلوس شا	Fulūs of Aurangzēb Shāh	سوورت سنه ۱۰ — — —	Sūrat 10th year.
(61)	سکه زد در جهان چو بدر منیر شاه اورنگ زیب عالم گیر ۱۱۰۴	Parts of this couplet only 1104 H.	سا ؟ ضرب جلوس مبارک سنه	The Blessed Accession year ?
(62)	as on (60)	—————	سنه دارالظفر بیجا پور فلوس ایلچپور	Year ? The gate of Victory Bījāpūr.
(63)	محمد شاه باد شاه (۱۱)۳۵	Muḥammad Shāh Bādshāh 1135 H.	فلوس ایلچپور	Fulūs of Ēlicpūr 4th year.
(64)	do., but year ۱۱۶ ?	—————	As on (63), but no year	—————

PLATE XVII.

(65)	سنه لکھنؤ ضرب	Year Lucknow	سنه مبارک جلوس	Year — The Blessed Accession.
(66)	۷ سنه اکبر آباد ضرب	Year 7 Akbarābād	۷ سنه مبارک جلوس	7th year of the Blessed Accession.

(69)	Gold as on (61), but of بدر		ضرب جلوس	—————
(70)	لاهور ضرب	Lāhōr	۱۷ ؟ سنه مبارک جلوس	17th year, &c.
(71)	لاهور ضرب ۱۰۷۴	Lāhōr 1074 H.	۷ سنه مبارک جلوس	7th year, &c.
(72)	سنه لاهور ضرب	Lāhōr	سنه مبارک جلوس	———year, &c.
(73)	لاهور (ضرب)	Lāhōr	سنه مبارک جلوس	do.
(74)	سنه بيرات ضرب	Bairāt	do.	do.
(75)	بيرات ضرب	do.	do.	do.
(76)	احد جلوس ضرب	1st year of Accession	(مبارک) عالمگیر شاہ فلوس	A blessed fulūs of 'Ālamgīr Shāh.
(77)	گلہا نہ ضرب	Mint ? Gulhāta or Gulhāna ?	as on (73).	—————

 PLATE XVIII.

(78)	سنه (فر)خ سیر	Farrukhsīyar	جلوس ؟ بدلولو	—————
(79)	(فر)خ سیر باد شاہ ۲۵ (۱۱)	Farrukhsīyar Bādshāh 1125 H.	س ضرب	—————

(80)	فرخ سیر	Farrukhsiyar	؟ ندالو س ب	—————
(81)	فرخ سیر شاه	Farrukhsiyar	؟ ندالو ع سنه (جلو) س ضرب	4th year.
(82)	ک سکه مبدار	—————	سنه فلوس ایلچپور	Fulūs of Ēlicpūr.
(83)	Quadruped to 1.	—————	ایلچپور ضرب	Ēlicpūr mint.
(84)	تذکة اکبر شاه	— — part of a Tanka of Akbar	۳۹ الهی ضرب (ب) پیرات	39th year Bairāt.
(85)	عالمگیر (فلو) س	‘Ālamgīr Fulūs	۱۱۱ میلا پور ضرب	year 111— Mailapūr.
(86)	محمد شاه فلوس ۱۱۵۹	Fulūs of Muḥammad Shāh 1159 H.	۱۱۱ جهان شاه ضرب ۲۹	Shāhjahānābād 29th year.
(87)	محمد شاه ۱۱۳۵	Muḥammad Shāh 1135 H.	(ضرب) ب کابل سنه	Kābul, year—
(88)	محمد شاه باد شاه غازی فلوس ۱۱۳۳	Fulūs of Muḥammad Shāh Bādshāh Ghāzī 1133 H.	ملتان ضرب جلوس مبارک ۳	Multān struck in the 3rd year of the Blessed Accession.
(89)	عالم گیر شاه فلوس باد	Fulūs of ‘Ālamgīr Bādshāh	۱۶ سنه کتک ضرب	16th year, Cuttack.

PLATE XIX.

(90)	(عا) لمگیر (با) د شاة غا (ز)	'Ālamgīr Bādshāh Ghāzī	۶ سنه ضرب حافظ آباد	Year 6, Hāfizābād.
(91)	سنه (مبا) رک جلوس		۱۱۱۸ سنه عظیم آباد ضرب	Year 1118 H. 'Azīmābād.
(92)	۴۰ سنه مبارک جلوس	40th year of, &c.	۸ (۱۱۰) سنه کابل	1108 year H. Kābul.
(93)			۱۰۶۸ سنه نارنول (ضرب) ب	1068 H. Nārnōl.
(94)			۷۴ (۱۰) سنه نارنول ضرب	1074 Nārnōl.
(95)	صاحب قران ثانی	Sāhib-i-Qirān Sānī	بیرات (ضرب) ب سنه ۱۰۴۸	Baīrāt 1048 H.
(96)	شاه جها (ن)	Shāh Jahān	۱۰۴۱ جلوس ۸	1041 ?
(97)	احمد شاه باد شاه غاز فلوس	Fulūs of Aḥmad Shāh Bādshāh Ghāzī	ملتان ضرب مبارک ۱۰ جلوس	Multān 10th year, &c.
(98)	احمد شاه باد شاه ک (سکه مبارک)	Aḥmad Shāh Bādshāh	جلوس احد ضرب پشاور	Struck at Peshawar, 1st year of accession.

(99)	عالم گیر ۱۱۷۲ ک سکه مبار	Blessed coin of 'Alamgīr II. 1172 H.	لاهورہ ب فلوس ضر	Fulūs of Lāhōr, 5th year.
(100)	As on (۹۹) but no year.		As on (۹۹)	—————
(101)	عالم گیر فلوس ۱۱۶۷	Fulūs of 'Alamgīr II. 1168 H.	شاه جهان آباد احد ضرب	Shāhjahānābād, 1st year.
(102)	As on (101) but year. ۱۱۶۹	do., but year 1169 H.	As on (101) but year ۲	do. 2nd year.

PLATE XX.

(103)	جهانسی ضرب fish	Jhānsī	عالم شا ۱۲۱۳ هـ فلوس	'Ālamshāhī 1213 H. Fulūs.
(104)	داملا ضرب	Dāmlā	۱۲۱۰ شاه — — — هـ	do. 121—H.
(105)	ناهن ضرب ۳۱	Nāhan 31st year	فلوس شا عالم	—————
(106)	بابولد (ضر) ب س	?	— باد شاه	Shāh 'Ālam Bādshāh
(107)	فرخ نگر (ضر) ب	Farrukhnagar	عالم شاه ۹۲۱۴	'Ālamshāhī 1214 H.
(108)	آباد حسین ۷۸ (۱۱)	Ḥusainābād 1178 H.	شاه عالم فلوس ۷۸ —	Fulūs of Shāh 'Ālam.
(109)	اکبر آباد ضرب فلوس	Akbarābād Fulūs	شاه عالم — باد شاه غاز	Fragments of Shāh 'Ālam Bādshāh Ghāzi.

(110)	اسلام آباد ضرب فلوس ۷۷ (۱۱)	Islāmābād Fulūs 1177 H.	باد شاه غاز	————
(111)	ضرب (J.) W. H. فلوس ۴۳	Fulūs J. W. H. 43rd year.	۱۲۱۷ باد شاه ک سکه مبارک	1217 H Blessed coin of Bādshāh
(112)	بیون یلد ضرب فلوس ۳۶	? Fulūs 36th year.	شاه عالم ———— ۱۲ باد شا غاز ک سکه مبارک	Blessed coin of Shāh 'Ālam Bādshāh Ghāzī.
(113)	نجیب آباد ضرب ۱۱ سنه	Najībābād 11th year.	عالم شا ۱۱۸۳ هـ فلوس	Fulūs of 'Ālam Shāh 1183 H.
(114)	نجیب آباد ضرب ۴۳ سنه	Najībābād. 43rd year.	عالم شا ۱۲۱۹ هـ فلوس	do. year 1216 H.

PLATE XXI.

(115)	عالم شا ۱۲۱۴ فلوس	Fulūs of 'Ālam Shāh 1214 H.	سہارنپور ضرب ۴۱ سنه	Sahāranpūr 41st year.
(116)	do.	do.	do., year ۴۲ and fish.	do. 42nd year.
(117)	do., ۱۲۱۸	do. 1218 H.	do., year ۴۴	do. 44th year.
(118)	do., ۱۲۱۵	do. 1215 H.	do., year ۴۲	do. 42nd year.

(119)	شاه عالم — ۱۲۱۰ باد شاه غاز ک سکه مبدار	Blessed coin of <u>Shāh</u> 'Ālam Bādshāh Ghāzī . 121(8)	مومن اباد ضرب فلوس ۴ (۴)	Mōminābād 44th year.
(120)	(شاه عالم) باد شا (۸)	<u>Shāh</u> 'Ālam Bādshāh	زرب ضرب ۳۸	— 38th year.
(121)	محمد اکبر ۱۲۲۱ باد شاه	Muḥammad Akbar 1221 H. Bādshāh	اکبر اباد Pistol (فلو) س احد	Akbarābād pistol fulūs 1st year.
(122)	محمد اکبر با — — — — —	Muḥammad Akbar Bā(dshāh)	سنه جلوس ضرب گوالیار	Gwālīār.
(123)	اکبر شاه ۱۲۲۲ فلوس	Falūs of Akbar <u>Shāh</u> II. 1222 H.	باد جهان شاه احد ضرب	<u>Shāh</u> jahānābād 1st year.
(124)	do.	do.	do., but year ۲	do. 2nd year.
(125)	do. ۱۲۲۵	do. year 1225 H.	do., but S ۴	do. 4th year.
(126)	do. (۱۲)۲۶	do. year 1226 H.	do. and سنه ۶	do. 6th year.

PLATE XXII.

(127)	شاه عالم شاه فلوس ۱۲۰۶	Fulūs of <u>Shāh</u> 'Ālam <u>Shāh</u> 1206 H.	(اباد) جهان شاه ضرب ۳۴	<u>Shāh</u> jahānābād 34th year.
(128)	عالم شاه س	Fulūs 'Ālam <u>Shāh</u>	شاه جهان اباد ۳۲	do. 32nd year.

(129)	عالم (شا) ۶۰۰ (۱۲) هـ فلوس	do. year 1206 H.	do. ۳۳	do. 33rd year.
(130)	عالم شاه ۱۲۴ فلوس	do. year 124 for 1174	do. ۱۵۵	do. 1st year.
(131)	(عالم) شاه ۱۱۲۵ سنه	'Ālam Shāh 1125 H. ? !	do. ۳۳	do. 33rd year.
(132)	عالم شا ۱۲۰۸ هـ فلوس	Fulūs of 'Ālam Shāh 1208 H.	do. ۲۵	do. 35th year.
(133)	۱۲۱ - د شاه عا	121- H.	اکبر آباد ضرب فلوس pistol	Akbarābād pistol fulūs.
(134)	do.	do.	do.	do.
(135)	۱۲۱۷ باد شا	1217 H.	pistol fish ضرب	No mint pistol and fish.
(136)	عالم باد عاز		بندر (بن) ضرب ۲۷ سنه	Bindraban 27th year.
(137)	۱۲۱۱ شاه	1211 H.	Kitār in س of فلوس	Bhartpūr ?
(138)	شا (با) شاه غاز		ضرب Fish Trisul	?

PLATE XXIII.

(139)	الور فلوس ضرب	Fulūs of Alwar.	(هفت) شصت نهمصد ۹۶۷ فی	7 60 900 967 H.
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(140)	کالانور فلوس ضرب	Kalānaur fulūs.	۳۷ شهر یور	37th Ilahī Shahrēwar (month).
(141)	شاه غاز جهان باد ش—(ا ۸)	Shāh Jahān Bādshāh Ghāzī	لکھنو (ضرب) ب فلوس	Lucknow Fulūs.
(142)	فلوس فتحپور	Fulūs of Fathpūr.	شش هشتاد نہصد	6 80 900 } 986 H.
(143)	۱۱۰۰ شاه باد شاه غاز	1100 ? ! Shāh 'Alam Bādshāh Ghāzī	۱ اذہ ضرب کلکتہ	One āna Calcutta.
(144)	جهاندہار شاہ فلوس ۱۱۲	Fulūs of Jahāndār Shāh	دارالملک ضرب کابل احد	Dāru-l-mulk Kābul 1st year.
(145)	محمد شاہ باد شاہ (۸)	Muḥammad Shāh Bādshāh.	ضرب (فلو) س ایلکچپور	Fulūs of Ēlicpūr.
(146)	بیدرگ یاگوف گ ف بیدردا گو	Fragment of ریگ تیغ و فتح و نصرت بے درنگ یافت از نانک گورو گویند سنگہ	لحیب اباد ضرب ۴۷ ۴۰	Najībābād 47 or 40th year.
(147)	۱۲۰۶ — د شاه ک سکہ مبارک	1206 Blessed coin of	بندر بن ضرب فلوس	Bandrabān Fulūs.
(148)	شاه غا فلوس	Shāh 'Ālam fulūs	رایج نگر	Mint not plain. "Current."
(149)	In hexagon اکبر	Akbar	۹۹۴	Nagar 994 H.
(150)	دارالضرب قلع اگرا	The Mint of the Fort Āgra	۹۳۶ فی تاریخ سنہ	Year date 936 H.

In all this long list of Mogul Coins there is not one that has been drawn before that I am aware of. Coins (1), (2), and (4) are four t̄ānkē pieces of Akbar from the Aḥmadābād mint. (3) is a two t̄ānkē piece of Salim Shāh and (4) a four t̄ānkē piece of the same prince. (6) is a half tanka of Akbar, and (7) is a full tanka. Going by weights, (8) is a quarter tanka, and (9) the 8th part of a tanka, (10) is another two t̄ānkē piece of Akbar's. What (11), (12) and (13) were intended for I do not know. They look like novelties introduced by Jahāngīr in the beginning of his reign. We know that he upset the value of mohurs and rupees by increasing to Akbar's system.

The coins on Plate XIII. show other vagaries of Jahāngīr. (14) and (15) are struck on old Sūrī dāms. (14) shows this a little, but (15) plainly. (17) is a Qandahār coin and (18) is a Kābul one. Both have irregular weights. (19) is a Rawān (20) is a Rājī and (21) is a half rājī, from the Ajmīr, Āgra and Dehlī mints respectively. (14)-(21) are all from my collection now in the Lahore Museum. (22) is a lovely fulūs of Shāh-jahān of the Bairāt mint. It is of the weight of a dām. (23) is also a fulūs of Shāh-jahān, but its irregular weight shows that changes had commenced in the copper coinage. Both these coins were in the cabinet of General Sir Alexander Cunningham when I drew them. (24) and (25) are a Multān and a Lāhōr fulūs of Aurangzēb of various weights (25) being half of (24).

On Plate XIV. (26) and (27) are dāms of Shāh-jahān from the Aḥmadābād mint. (28) and (30) are evidently half dāms. All are styled fulūs on the coins themselves. (31) is a strange coin of Akbar II. with the name of the Aḥmadābād mint on it. I obtained one like this in the Kāngra Valley in 1886. (32) is a dām of Jahāngīr's from the Sūrat mint: (33) and (34) are dāms from the same mint in the time of Shāh Jahān. (35) is evidently a fulūs of Rafī'u-d-darajāt's and (36) one of Muḥammad Shāh's from the same mint. From all this it is evident that Mogul copper coins were not scarce either at Sūrat or Aḥmadābād. (37) is a dām of Jahāngīr's from the Udaipūr mint, (38) is a copper coin of Shāh-jahān from the Ujain mint conforming to the Mālwa currency in shape and weight.

On Plate XV. all the coins are of Aurangzēb except the last, (52) (39) and (40) are from the Shāh-jahānābād mint and exhibit dates, (41)-(44) are from the mint at Multān, (45) and (46) are from Nārñōl. I have a lot of these and all are without dates except two I was fortunate enough to find while this paper was in progress. I give them on Plate VIII. — (93) and (94). They are both dated. (47) and (48) puzzle me. They are evidently Aurangzēb's coins, but I cannot read the mint; (49) is a Sūrat coin, (50) one from Ḥaidarābād, as is also

I think (51). The date on (52) makes it an Ēlicpūr coin of Shāh 'Ālam I.

Plate XVI. opens with a Shōlāpūr fulūs of Aurangzēb, which is followed by (54) and (55) of the 5th year of Shāh 'Ālam I. from the same mint. (56) is an Aurangzēb fulūs from the Kulburga mint, (57)–(61) are our fulūs of different styles and weights from the Sūrāt mint of Aurangzēb. It will be noticed that (59) comes up to the dām standard and (60) is half a dām. The mint of (61) with its rupee inscription I have not been able to read, but (62) is from the Bijāpūr mint, (63) is a heavy coin of Muḥammad Shāh's from the Ēlicpūr mint. It is nearly the weight of a dām, (64) is probably of the same king and is from the same mint.

Plate XVII. deals also with the coins of Aurangzēb. (65) is of the Lucknow mint while (66) is from Akbarābād (Āgra), (67) and (68) are from Sūrāt, (69) is a small gold coin of Aurangzēb which came into my hands for a day when I was drawing this plate, (70) to (73) are all different varieties from the Lāhōr mint, (74) and (75) I assign to Bairāt, (76) is doubtful as to mint, and the mint name on (77) I have not yet made out. There is no doubt about the king who struck all these coins. The years tell us, and they help us to assign dateless coins by showing us the peculiar style of Aurangzēb's copper coins,—the letters are mixed up strangely but only on the copper coins of Aurangzēb in this style.

Plate XVIII. opens with four coins (78)–(81) of Farrukhsiyar. The mint of (81) may be Sūrāt. They all came to me from my Bombay friends Messrs. Malabarwalla and Kotwal. (82) is an Ēlicpūr coin, but I don't know of what king, (83) is a late modern coin from the same mint, (84) is a Bairāt coin of Akbar's but of irregular weight, (85) comes from Mailāpūr, the name of a part of the city of Madras. It is of the times of Aurangzēb. It belongs now to the Rev. J. E. Tracey, M.A., (86) is a unique coin of Muḥammad Shāh from the Shāhjahanābād mint. It is singular that whereas mohurs and rupees of this king from this mint are exceedingly common, this is the only copper coin of this king I have seen from this mint. From this I infer that the copper coinage of the Empire was so abundant there was no need for any more to be struck. (87) is a Kābul coin of Muḥammad Shāh: (88) is of the same king but from the Multān mint. The specimen I made this drawing from is the most beautiful and perfectly finished Mogul copper coin I know. (89) is from the Cuttack mint and is of the time of 'Ālamgīr Aurangzēb.

On Plate XIX. (90) is of the Hāfizābād mint and is dated the 6th year of 'Ālamgīr, but which of the 'Ālamgīrs I don't know. Of (91)

there is no doubt that it was struck at the end of the reign of Aurang-zēb in Patna when the name had been changed to 'Azīmābād. (92) is a Kābul coin of the same Emperor, (93) and (94) are the two dated coins from the Nārñōl mint. (95) is a Bairāt coin of Shāh Jahān bearing not his name but his title, Sāhib-i-Qirān Sānī. (96) is also a fulūs of Shāh Jahān, with a date, but not with the mint name on it. (97) must be a coin of Aḥmad Shāh Durrānī struck in Multān: but I think (98) is one of the Delhī king Aḥmad Shāh, struck in Peshāwur. (99) and (100) are two coins from the Lāhōr mint of 'Ālamgīr II, while (101) and (102) are from the Shāhjabānābād mint of the same Emperor as is seen from the dates they bear.

Plate XX. is the first plate of coins I drew for this paper which I intended should deal only with the copper coins of Shāh 'Ālam II. All the coins in this plate are of his time. Helpless though he was, the glamour of his name and titles was such that they were used not only by the East India Company on their issues from the Murshidābād, Benares, Sūrāt and Farrukhābād mints, but by Native States all over Northern India. Small mints were established in out-of-the-way places. Hence copper coins bearing fragments of the name and titles of Shāh 'Ālam II are exceedingly numerous. There are many with no mint name on them. I give some of these. Most of those I have drawn are given by reason of the mint names on them. (103) is from Jhānsī. (104) is from Dāmlā, a place not given in Hunter's Gazetteer of India. It is, however, in Fullarton's Gazetteer of the world stated to be "on the canal of 'Alī Mardān Khān, 25 miles W. N. W. of Sahāranpūr." This was confirmed by A. Phelan, Esq., Executive Engineer, Western Jumna Canal, who in answer to a note of mine most courteously informed me that "Dāmlā is a large ancient village lying on the right bank of the Western Jumna Canal" and that "Damla contains many Pathan families." I have seen one other copper coin from this Dāmlā mint: (105) comes from the Nāhan mint. I have seen other coins from this mint. On one was the name of Bahādur Shāh, Mulzim (servant) of Gīrvānyodh, Mahārāja of Nepāl. This was struck during the Gurkha occupation of Nāhan. Another bears the name of a rāja of Sirmūr, the state of which Nāhan is capital. This coin (105) differs from both those I have mentioned. I don't know what to make out of the mint on (106), but (107) is certainly from the Farrukhnagar mint and 108 is from Ḥusainābād, (109) is one type of Shāh 'Ālam's Akbarābād copper coins. On (103), (104) and (105) there is a figure to the *r.* or *l.* We see from this Akbarābād coin that a fish is intended by it. The fish standard was an emblem of royalty; hence coins bear the sign of the fish to show

their connexion with the Central Government.¹ It seems strange that the fish is found only on the coins of Shāh 'Ālam and in the arms of the kings of Lucknow. (110) is of the Islāmābād mint. This name belongs to several towns in India. I do not believe that this coin came from Chittagong, but from some town in the N.-W. Provinces. We read "Muttra changed its name to Islāmābād and was thus called in all official documents, as well as by the people." Elliot Vol. VII. p. 26. (111) is a strange coin. It is of Akbarābād and has on it J. W. H. John William Hession was Commander of the Fort of Āgra. He died in 1803, the year the English took the Fort. He had been a soldier of fortune. There is a very good sketch of his life in Compton's book on Military Adventurers in India. (112) I took this coin to be one of Monghīr, but I fancy I am mistaken. From the Najibābād mints both (113) and (114) were issued. On the smaller size the fish is often represented as standing up and not as here lying to the *r*.

Plate XXI.—(115)–(118) are coins of two sizes from the Sahāranpūr mint in the latter part of the reign of Shāh 'Ālam II. (119) was produced in the Mominābād mint, but I cannot say what the mint name is on (120). Coins (121)–(126) are of Akbar II. (121) has the name of the Akbarābād mint on it and the pistol. (122) was struck in Gwālīār. The sword, with its point over the ج of جلوس is a peculiarity of this coin. Coins with the sword in that position are very common, but coins bearing the mint name گوالیار are very rare. (123)–(126) were struck in Shāhjahānābād. They are about the same in weight as the rupees of Akbar II. (125) is peculiar since it has an English letter S instead of the Arabic word سنه on it for year. (126) reverts to the use of سنه.

Plate XXII.—The upper half of this plate contains six coins of Shāh 'Ālam II all from the Shāhjahānābād mint. All have the fish on them except (127), (130) has a date on it ۱۲۴ which must be intended for ۱۱۷۴ as the regnal year is 1. I think ۱ and ۷ have been inadvertently joined together. The date on (131) is certainly 1125 though the regnal year is 33. 1125 would make the coin one of Farrukhsiyar. Pistol pice of Shāh 'Ālam II, are shown in coins (133)–(135), the two first being from the Akbarābād mint. (136) is a fine specimen of a coin of Shāh 'Ālam II from the Bindraban mint. There is a different specimen with a fish on it, in Plate XII (147) from the same mint. There is no mint at all on (137) but we cannot be far wrong if we assign it to Bhartpūr, the symbol of that place being the kitār which occupies the field of the reverse. The symbols on (138) a trisūl and standing fish, belong to

¹ [It may be worth mentioning that the sign manual of the great Darbhanga Rāj is a fish (*mahi*). Ed.]

some town I am not acquainted with. Both (137) and (138) are coins of Shāh 'Ālam II.

Plate XXIII.—The coins on this plate are a miscellaneous lot with which I became acquainted during the time I was drawing the other plates. (139) is an early dām of Akbar's from the Alwar mint. (140) is the only dām of the Kalānaur mint that I have ever seen.¹ I got it in Ludīāna. Kalānaur was one of Akbar's copper mints and it was the place where he was crowned. (141) is a rare dām of Shāh Jahān from the Lucknow mint. Lucknow was a mint of Shēr Shāh's, Akbar's and other Mogul Emperors. (142) is the smallest copper coin I have seen from the Fathpūr Sikrī mint. It is the eighth of a dām of Akbar. I do not know what to make out of (143). It is a Calcutta mint one-anna piece. It seems to bear the date 1100 H. but the two dots may belong to the ش of Shāh. It was struck by the East India Company. It is the only one I have ever seen and is in the Society's own collection. I obtained (144), a fine coin of Jahāndār Shāh from the Kābul mint, at the beginning of this month. (145) is a good specimen of the coins from the Ēlicpūr mint in the time of Muḥammad Shāh. One of the most curious coins in this paper is (146). It has on it fragments of the couplet on Sikh rupees on one side, and on the other the name of the Najibābād mint, with its standing fish and the year of the reign of Shāh 'Ālam II. It must have been struck when the Sikhs were in power in the Dūāb. I have one with the same Sikh fragments on but struck in Jaipūr. The legends on (148) are not full enough to enable me to give the mint. They only tell us that the coin is one of Shāh 'Ālam II. The use of راج in a circle is peculiar. I have a second specimen half the weight of this. (149) has been a puzzle to me for a long time. The date on it is ۹۹۴۰. This confirms my reading of اکبر on the other side. I make out the mint to be Nagar نگر but I know nothing about it. As I have no coin of Bābar in this paper on Mogul copper coins, I thought I would finish off with (150) which is a fine specimen from the mint in the Fort of Āgra in 936 H. I ought to have given on a thirteenth plate the coins in bronze of Humāyūn. They are from the Āgra mint as Dāru-l-khilāfat, Dāru-l-amān, Dāru-l-'adl and Qilā-i-Āgra Dāru-z-zarb: from the Dāru-l-mulk Ḥaẓrat Delhī mint; Dāru-l-khilāfat Lāhōr; Mandū; Shahr-i-Mukarram Campānīr, and Dāru-z-zarb Khitta-i-Mutabarrak Jaunpūr mints. But some of these have already been edited and drawn.

One thing has been prominently brought before us, the thorough jumble in which the copper coinage of the Moguls was. It must be

¹ Dr. Vost says he has another.

remembered that before the advent of the copper coinage of the East India Company, the coins we have been describing were current in the country. But besides these there were what are now called Mansūrī pice also current. These are still to the fore in many Native towns. They are simply uncoined lumps of copper. It was time one great power rose in India to give the Empire a uniform coinage, one that would enable India to be an empire where extensive commerce could be carried on.

We have not seen the names of many mints. We will put them down all together here:—Aḥmadābād, Agra, Bairāt, Qandahār, Kābul, Ajmīr, Dehlī, Patna, Multān, Lāhōr, Sūrat, Udaipūr, Ujain, Shāhjahānābād, Nārṇol, Ḥaidarābād, Shōlāpūr, Kulburga, Bījāpūr, Ēlicpūr, Lucknow, Akbarābād, Mailāpūr, Cuttack, Ḥafīzabad, ‘Azīmābād, Peshāwūr, Jhānsī, Dāmlā, Nāhan, Farrukhnagar, Ḥusainābād, Najībād, Sahāranpūr, Mōminābād, Gwāliyār, Bindraban, Bharṭpūr, Alwar, Kalānaur, Fathpūr, Calcutta and Nagar. These are 42 in number. There were several I could not make out. These raise the numbers to about 50. We know from catalogues lately published that there are many other copper coins of the Moguls from other mints. These mints show that during the time of the Mogul Empire Copper Coins were struck all over India from Cuttack and Calcutta in the East to Kābul and Qandahār in the West, from Peshawur in the north to Ḥaidarābād, Shōlāpūr and Mailāpūr in the South.

Of course the subject of the Copper Coins of the Moguls has not been a matter of study for a long time. My paper on Copper Coins of Akbar, published in this *Journal* in 1880, drew attention to it. Mr. E. E. Oliver followed with an excellent paper on coins from one odd find made by him in one of his official tours. In 1885 I gave “Some more Copper Coins of Akbar” in this *Journal*. In 1890 I wrote a paper for the *Indian Antiquary* on “Rare Copper Coins of Akbar.” In the “Catalogue of Mogul and Sūrī coins purchased by the Panjāb Government from me, and now in the Lahore Museum,” I gave 485 Mogul Copper Coins. There are unfortunately no plates in that catalogue. I have not indented on the coins in the Lāhore Museum extensively in order to give the coins in this paper. Some of Jahāngīr, Muḥammad Shāh and ‘Ālamgīr I and II and of Akbar II, I wanted to give and I obtained the loan of them.

There is still an open field for the numismatic student. The bāzārs of India can now be reached by railway. The exertions of my esteemed correspondents in Aḥmadābād, Bombay and Poona have shown me that in Western India alone we have an enormous field open to us. In a letter from my friend Dr. Vost, he says that he has made several

discoveries of new things of Akbar's. The conviction is borne upon me that Akbar coined so very extensively that there was not much need for his successors to do much towards supplying a copper currency. We have seen however that coins of Jahāngīr, Shahjahān, Aurangzēb, Shāh 'Ālam I, Jahāndār Shāh, Farrukhsiyar, Rafi'ū-d-darajāt, Muḥammad Shāh, Aḥmad Shāh, 'Ālamgīr II, Shāh 'Ālam II, and Akbar II, are known. Jahāngīr's copper coins are very plentiful in Aḥmadābad, Aurangzēb's abound in the Panjāb bāzārs. Of such kings as Jahāndār Shāh and Rafi'ū-d-darajāt we cannot expect many coins in copper. But I know that my esteemed friend Mr. King of Peshāwar has a beautiful duplicate of Jahāndār from the Kābul mint and one of Rafi'ū-d-darajāt from the Ēlicpūr mint.

Now that Indian numismatists have begun to work at the Copper Coins of the Mogul Empire, they will, I doubt not, bearing in mind that the copper coins were the currency of the masses, accumulate much information. I am a fixture in Amritsar, too poor to travel and hence my discoveries are *nil*. But I am certain that as yet we are only on the shore of the ocean. There is much more in store for us than what we have found cast up on the strand. We must dive deep down and we shall be rewarded far beyond what we have as yet dreamt of. I commend the subject to my fellow workers.

In conclusion I must apologize for the utter want of order in the coins given in the plates. I cannot get coins to come to me in order. One friend sends me one lot, another a second: I go to the bāzār and perhaps fish up one or two more. A dealer drops in and I obtain from him at a ruinous price a specimen or two. When the coins are in my hands I draw them. My time is pretty fully occupied and I cannot redraw them. Hence I am compelled to give the coins in the order in which I obtain them. It is gratifying to me to know that my past efforts have been appreciated. I trust that with all its faults this paper may be of some use and at any rate help to deepen the interest felt in the subject of the Copper Coinage of the Moguls—the coinage in use by the masses of a vast Empire for about three centuries.

*The Khūrshīd Jahān Numā of Sayyad Ilāhī Bakhsh al Husainī
Angrēzābādī.—By H. BEVERIDGE, I.C.S. (Retired).*

(Read, December 1894.)

INTRODUCTION.

On the 20th May, 1889, Mr. Pargiter reported to our Society that a Muhammadan schoolmaster, in the district of Māldah, had written an historical work in Persian, and suggested that it should be examined in order to ascertain if it was worth publishing. In consequence of this, the author, whose name was Ilāhī Bakhsh, was invited to send his MS. for inspection; but the old man was so attached to his book, that he refused to let it out of his sight, and as he could not afford to come with it to Calcutta, nothing further was done at that time. Subsequently I visited Māldah, and had one or two interviews with the author. I found that the book was a History of the World from the days of Adam, and that in all probability it was not worth publishing in its entirety. I thought, however, that the account of Māldah, especially that of the ruins of Gauṛ and Paṇḍuā, might be valuable, and suggested to the author that he should extract this portion of his work, and submit it for examination. He accepted this proposal, and after some difficulty in finding an amanuensis, for Ilāhī Bakhsh was too old and feeble to make the extract himself, the portion of the work which related to Bengal was copied out and sent to me in England, in 1891. I had not then time or knowledge enough to examine the extract fully, and so I sent it out to Calcutta to our Society, with some remarks. There it was received and partially analysed by Maulvi Abdul Hak Abid, 2nd Master of the Calcutta Madrasah, and eventually it was at my request, returned to me this year. I have now read the whole of it, and proceed to give an analysis of it, and a translation of such portions as appear interesting.¹ I feel that the book has been left to

¹ I desire to acknowledge my obligations to M. 'Abdu-s-salām, M.A., Deputy Magistrate, for his kindness in correcting my translation and in explaining the Arabic inscriptions, &c.

me as a sort of legacy by the author, who died in 1892 not long after he sent it to me.

The extract forms a quarto volume of 498 pages. It contains not only a description of Māldah and its antiquities, but also a history of Bengal from the earliest times down to 1863. It also contains the preface to the whole work, and a chapter giving some account of the author. From this I take the following particulars:—

Memoir.

Sayyad Ilāhī Bakhsh was born in 1240 A.H., or 1824 A.D., at English Bāzār, in the district of Māldah.¹ The family came originally from the Upper Provinces, and members of it had held high office under the kings of Bengal. Eventually, on account of old age, or for some other reason, they retired to the town of Māldah, where they settled in a quarter known as the Bērōzgār Ṭōla, or quarter of the unemployed—apparently because it was chiefly occupied by persons out of employ. This quarter was in the neighbourhood of Mughal Ṭōlā, and the well-known mosque of Ma'sūm Saudāgar. Then the family moved into another old quarter of Māldah called Sanak Mahan,² and eventually they came to English Bazār. The author's grandfather, Mihru-llāh, is buried at Old Māldah; but he appears to have lived at English Bazār, and in the service of the English Government, for the author's father, 'Alī Bakhsh was born there, as was also the author. His birth-place, he tell us, was in the quarter known as Cak Sayyad Anbīa. He spent all his life in English Bazār, and died there on 2nd March, 1892.

In his latter days he was Persian teacher in the District School. Ilāhī Bakhsh was a man of great simplicity of mind, and an enthusiastic student of history: perhaps, he acquired this taste from his friend and teacher Munshi 'Abdu-l-karīm, who in his turn was the pupil of Ghulām Husain Salīm, the author of the Riyāzu-s-salātīn. Perhaps, too, he became interested in Gaur from the fact that he inherited from his paternal aunt, some rent-free land in Hazratnagar, otherwise Qāzīgāō, which is near the shrine of Makhdūm Ākhī Sirāju-d-dīn. He also speaks at page 144, of visiting the tomb of an ancestor of his, named Mīr Karhān, who died at Māldah in 1199 A.H. (1784 A.D.).

I now proceed to give an account of his book.

Analysis.

Ilāhī Bakhsh entitled his book the *Khūrshīd Jahān Numā*, or the World-displaying Sun. The title is a chronogram, and yields the date 1270 A.H., or 1853 A.D., this being the time when the book was begun. He was occu-

¹ It is the head-quarters of the district and is often called Māldah, or New Māldah. Māldah, properly so called, is about five miles north of English Bazār, and is on the other, or eastern, side of the Mahānanda, opposite to its junction with the Kālindrī.

² Perhaps Shānk Mōhān.

pied with it, more or less, for the rest of his life; but he appears to have finished the history of Bengal in 1280 A.H., or 1863 A.D., for this is the date to which he has brought down his narration of events. Continuing the fancy of the title, he divided his book into twelve Būrj, or signs of the Zodiac. The first contained an account of the world, and the next five described America, Africa, Europe, Asia, Australia, and Polynesia, and the various races and religions of men. The 7th dealt with Prophets, the 8th with Philosophers, the 9th with Saints and Poets, the 10th with Teachers and Pupils, *i.e.*, I presume, Education, the 11th with Buildings, &c., and the 12th with an Account of the Author.

As usual, the work begins with praises of God and of Muḥammad. Then it proceeds to pronounce an eulogium on Munshi 'Abdu-l-karīm, the friend and instructor of the author. We are told that 'Abdu-l-karīm was originally an inhabitant of Bārḥ, in the district of Patna, that he came to Māldah and entered into the service of Ghulām Ḥusain, the author of the *Riyāzu-s-salāṭīn*, and who was at the time Dāk Munshī, or Postmaster, under Mr. George Udny. 'Abdu-l-karīm was for a time Bakhshī, or Assistant, to the Nāẓir, or Sheriff, and afterwards became a Mukhtar. He appears to have been a good Persian scholar, and one or two inscriptions for mosques which he composed, have been quoted by Ilāhī Bakhsh.

In the portion of the *Khūrshīd Jahān Numā* with which we are concerned, the first date given is that of the Deluge. The author tells us that this took place 2971 years before the era of the Hijra, a computation which gives us the same date as that assigned by Christian writers, for $2971 - 622 = 2349$ B.C. The reason that he comes to mention this date is that he, in accord with the *Riyāzu-s-salāṭīn*, derives the name of Bengal from Bang, the son of Hind, and the word *āl* meaning an embankment. The latter part of this derivation is also that adopted by Abū-l-faẓl. According to Ghulām Ḥusain and Ilāhī Bakhsh, Bang was the second son of Hind, who was the eldest of the six sons of Ham, and consequently a grandson of Noah.

After this, the author proceeds to describe Bengal and the Bengalis, and to give an account of each district. Much of this part is taken from the *Riyāz* and the *Arāish-i-Maḥfil*, and except for the account of Māldah, is not worth printing. It may be noticed here that Ghulām Ḥusain was a native of Zaidpūr in Oude, and that neither he nor Ilāhī Bakhsh seem to have considered themselves to be Bengalis. Both are rather severe on the Bengali character and customs, but Ilāhī Bakhsh has considerably softened Ghulām Ḥusain's remarks. The account of Māldah begins at page 111. The following are the only novelties which I noticed in the account of the other districts.

In the account of Calcutta, we have a list of the mosques and copies of the inscriptions on them. None of them, however, is old, and it is unnecessary to print them. Then at page 20, we have a Persian verse containing a pun on the name of Sir John Shore (Lord Teignmouth). *Shōr* means salt or brackish in Persian, and so we are told in allusion to the climate and water, and to the name of the Governor-General.

آب شور و زمین سراسر شور¹
شور فرمان روي کلکته

“The water is salt, and the land is altogether salt (*shōr*).
And salt (Shore) is the ruler of Calcutta.”

In the account of Murshidābād (page 44) the tomb of *Shāh Martazī* Anand, now washed away by the Bhāgīrathi, is noticed, and we are told the interesting fact, that the wife of this Muhammadan saint was a Brahman's daughter, and named Anandī. She and their son were buried beside him, and probably her name forms part of the word Mortousahanadi, which is given as a stage in the itinerary from Bengal to Lhassa, to be found in Tieffenthaler, Vol. III, p. 206. We are also told that the saint *Shāh Martazī* was a contemporary of *Shāh Ni'matu-llāh Matwalī Fīrōzpūrī* who was the spiritual guide of Sultān Shujā' and of whom the author gives a biography at page 204, in his account of Gaur. *Shāh Ni'mat* was a native of Karnaul, but died at Fīrōzpūr, a quarter of Gaur, in 1080 A.H., or 1669 A.D.

In the account of Cuttack, the dates of the erection of some buildings are given (pp. 47-49), but they are probably well known. *Ilāhī Bakhsh* also mentions, what I do not remember to have read elsewhere, that Kālā Pahār, the famous general of Sulaimān Kararānī, was a Brahman's son and became a Muhammadan owing to a princess of Gaur having fallen in love with him and having married him. That he was originally a Hindu appears probable from Mr. Blochmann's statement, that his real name was Rājū.²

The account of Māldah begins as I have stated, at page 111. This is the really valuable part of the book. The author had a great deal of local knowledge and he gives some inscriptions and many particulars which are not to be found in Ravenshaw's Gaur, or in Cunningham's Archæological Reports, or anywhere else, so far as I know. The praise which Major Stewart has bestowed on *Ghulām Husain*, viz., that he took considerable pains to ascertain the dates of the inscriptions on buildings, is still more deserved by *Ilāhī Bakhsh*. He must have worked very hard, and paid many visits to Gaur and Paṇḍuā, for he not only gives numerous inscriptions, but he also states the dimensions of the various buildings, and such traditions as he could collect about their origin, &c. No doubt it was some

¹ *Ilāhī Bakhsh* has given only two lines. Some other lines from the same poet (probably *Ghālib*), who wrote a skit on Calcutta Society, may be here quoted:—

پارۀ از زمين دوزخ بود * که بران شد بذای کلکته
خارش و داد و پيش و اسهال * اين همه تحفه هاي کلکته
خانسامان و بوچهرو و قصاب * اين همه شرفا هاي کلکته

(Translation).

Calcutta was built on a portion of the region of hell. The gifts of Calcutta are itch, ringworm, dysentery and diarrhoea, and its gentry consist of butlers and butchers.

² J. A. S. B., Vol. xlv., p. 303.

advantage to him to come after Ghulām Husain, but he had the greater advantage of being born and bred in Māldah, whereas Ghulām Husain seems only to have come there in the latter days of his life. Unfortunately for Ilāhī Bakhsh, many of the inscriptions which were unknown when he copied them, have been published in our *Journal* and in Ravenshaw's *Gaur*, &c., owing to the labours of Mr. Blochmann, Dr. Wise, Mr. Westmacott, Mr. Bourke, Mr. Heeley, General Cunningham, and others. I have endeavoured to separate the new from the old, and have given those which have been already published only when there is some difference of reading, &c.

Ilāhī Bakhsh praises the climate of Māldah, which, he says, is the best in Bengal. It was made a Joint-Magistracy, he tells us, in 1228 A.H. (1813), and the first Magistrate was Mr. William Braddon. He gives many statistics, and notices the inscription by Mr. Thomas Henchman, at the cutcherries in English Bāzār, dated 1771. I do not think, however, that there is anything new till we come to page 129, where he tells us of a tomb in English Bāzār called Ghōrā Shāhīd. It is near the old silk factory known as the Barāh Khāna, and the people of Māldah worship and make offerings there. However, Munshī 'Abdu-l-karīm told the author that it was really the tomb of some (English ?) official of the Factory.

Noticing the Charitable Dispensary, the author observes that here used to be the house of Ghulām Husain. Near here in front of a mosque, was placed "some years ago," a stone containing the important inscription of Husain Shāh, dated 1st Ramzan 907 (10th March 1502), which records the building of a Madrasa. This is one of the inscriptions which Mr. Westmacott sent to Blochmann. See *J. A. S. B.*, XLII, p. 303, and Ravenshaw's *Gaur*, p. 80. Ilāhī Bakhsh gives the inscription, but it need not be republished. It is situated at a mosque near the Police Station, and in the quarter known as Fīrōzpūr Imlī tōlā. He also notices, page 133, an inscription set up in an Imāmbārah in Cak Anbīā, and bearing the date 913 (1507). This I believe to be a new inscription. It is as follows:—

بني هذا المسجد مجلس المجالس مجلس اخيار
في سنة ثلثة عشرة وتسعمائة من هجر النبوة

"The builder of this mosque was the Majlisu-l-majālis, the excellent Majlis, in the year of the Flight 913."

It was in this quarter that the author was born. In the quarter known as Cak Qarbān Alī is the tomb of Ghulām Husain, author of the *Riyāzu-s-salātīn*, who died in 1233 A.H. or 1817. The chronogram, composed by 'Abdu-l-karīm is (1233) منشي ز عالم رفته. "The Munshi left the world."

At page 137 the places of interest near English Bāzār are noticed. The first is Ghaishpūr, about two miles north north-west of the cutcherries. It is the residence of a family of Gosains, who came from Khurdhā in Orissa. The author gives a genealogical tree of the family and speaks of one Āhil Bihārī as a distinguished member of it.

At page 138, Nīma Sarāī and its tower or minaret are noticed, and then the town of Māldah is described. At page 130, there is a description of

Ma'sūm Saudāgar's mosque, in Mughal-ṭolā. The inscription with the date 974 (1566) is mentioned, but it is to be found in Ravenshaw, page 144. A shrine called Shāh Gadā is mentioned, where there is an inscription, dated 911 (1505) which has been removed from some mosque. This inscription is given in *J. A. S. B.*, XLII, p. 294, No. 27.

At page 140 the Kaṭrah is noticed, and the author follows the author of the Riyāz in considering this to be the Sarai of the Emperor Fīrōz Shāh. He encamped at Māldah in 754 (1353) when he came to make war on Shamsu-d-dīn Ilyās, and so the quarter is called Fīrōzpūr to this day (See the Riyāz, page 96).

Phūṭī Masjid. This is the mosque called in Ravenshaw, page 44, the Fauti or Burial mosque. The real name, however, appears to be Phūṭī, i.e., the cracked or broken mosque. The inscription on it is given in Ravenshaw, page 780, or *J. A. S. B.*, XLIII, p. 302, but Ilāhī Bakhsh reads it somewhat differently from Mr. Blochmann. According to the former, the name of the builder is the Khān Ma'zam Alagh Shēr Dil Khān, and the date is 20th Shawwāl 900 (14th July, 1495). Near it is a tomb, which is probably that of the builder.

Sir Barī or Cut-head. This is a shrine north of the Kaṭrah, and west of the high road. People call it the shrine of the Pīr of Māldah and give the name of Māldah specially to this place. Some say it is the shrine of a martyr, and some say that when Ḥaẓrat Ānwar, the son of Nūr Quṭb, was put to death at Sōnārgāō by order of Rajah Kans (Ganesh), his head arrived at this place.

Mahalla Shānk Mōhān. In this quarter and west of the high road, there is a mosque built by Shaikh Faqīr Muḥammad and his son Shaikh Bhīkah. Over the door is an inscription, which must have formerly belonged to a mosque built in 876 (1471), in the reign of Yūsuf Shāh. This inscription is given in *J. A. S. B.*, XLIII, p. 298, and is referred to by Cunningham in his Archæological Report, XV, p. 78. But when Mr. Westmacott visited the place, it was impossible to obtain a clear reading. He thought the date to be 870. General Cunningham inclines to read it as 878.

Ilāhī Bakhsh's copy was made at an earlier date, and when the inscription was in better order. His reading is as follows:—

قال النبي صلى الله عليه وسلم من بني مسجداً لله بني الله له قصرًا في الجنة
مثله بني في امر السلطان شمس الدنيا و الدين ابي المظفر يوسف شاه بن باريك شاه
بن محمود شاه السلطان خلد الله ملكه و سلطنته (some words are illegible). في التاريخ
غرة جمادى الاولى سنة سبعين و ثمانمائة *

The Prophet of God (Blessing and peace be upon him) has said, 'Whoever builds a mosque for God, God similarly builds a palace for him in Paradise.' Under order of the sovereign who is sun of the world and of religion, Abū-l-muẓaffar Yūsuf Shāh son of Bārbak Shāh son of Maḥmūd Shāh (may God preserve his empire) this mosque was built on 1st Jamādiu-l-awwal, 870 A.H.

The inscription is an important one, for according to the usual chronology Yūsuf did not succeed his father Bārbak till 879. Ilāhī Bakhsh remarks that his date of 876¹ disagrees with the chronology of Yūsuf's reign. Blochmann suggests that Yūsuf built it when he was prince.

The author now proceeds to Paṇḍuā. This is an important part of his book. His account of the two shrines there—that of Jalālu-d-dīn Tabrīzī, The Twenty-two Thousand, and that of Nūr Quṭb, or the Six Thousand, is very full, and has some interesting features. I have, therefore, translated nearly the whole of it.

Paṇḍuā was a large city in old times, and is situated twelve miles north of Angrēzābād (English Bāzār). It used to be well peopled, and from the beginning of the reign of Shamsu-d-dīn Īlyās Shāh to the end of the reign of Rajah Kans six kings ruled there for the period of fifty-two years.² In 795 A.H. (1392) Jalālu-d-dīn, the son of Rajah Kans, removed the seat of sovereignty to Gaur. It appears that in his father's time many idol-temples were erected, and that these fell into decay on Jalālu-d-dīn's³ accession. Yet the city was still populous during his reign. Now it is full of jungle and the abode of wild animals. All that is left are the houses occupied by the keepers of the shrines of the saints Shāh Jalāl of Tabrīz and Nūr Quṭb 'Ālam. The climate too of the city is now very bad. Although there are remains of many old buildings in the jungle, the following are the most important and those which are in a state of preservation.

I.

The buildings of the Barī Dargāh or Great Shrine.

These consist of the Arb'a'in Khāna⁴ or Quadragesimal House and other buildings of Ḥaẓrat⁵ Shāh Jalāl Tabrīzī. The original shrine

¹ Though the copy of the inscription gives 870, the author states the date to be 876.

² From 743–795, but the author might perhaps have included 'Alī Mubārak, the predecessor of Shamsu-d-dīn, and who reigned according to one account for a year and five months, and according to another for five years. His reign is supposed to have begun in 741 (1340) and from the tenor of Ghulām Ḥusain's narrative, *viz.*, the story about the building of the shrine of Jalālu-d-dīn, and the statement that Shamsu-d-dīn Īlyās arrived at Paṇḍuā, it would appear that 'Alī Mubārak had his capital at Paṇḍuā. Mr. Blochmann also calls Paṇḍuā 'Alī Shāh's capital, *J. A. S. B.*, XLII, 254.

³ Jalālu-d-dīn received this name from Nūr Quṭb, his original name having been Jadu. Probably he was called Jalālu-d-dīn in allusion to the saint. It is interesting to find that there is a village in Māldah near Bhōlānāth, called Jādunagar. See *M. S.*, p. 181.

⁴ Arb'a'in Khāna and Makān Arb'a'in are synonyms for Cillakhāna and mean the house or cell occupied by Muhammadan saints during their Lent.

⁵ I suspect that Paṇḍuā is called Ḥaẓrat on account of the saints and not of the Sultans.

was erected by Sultān ‘Alī Mubārak at the instance of the saint in 742 A.H. (1341), and is now so destroyed that no trace of it remains.¹ Some of the existing buildings were put up by Shāh Ni‘matu-llāh Matwalī of Fīrōzpūr (in Gaur), and some by other persons. The list is as follows:—

I.—The large Arba‘in Khāna. This quadragesimal cell of the saint is a spacious building, facing the east, and was erected by Shāh Ni‘matu-llāh Matwalī, in 1075 A.H. (1664). This date is engraved on the east of the building, at the left hand side in the following chronogram:²—

چون این عالی عمارت یافت ترتیب
شده تاریخ روشن آست—ان باد

When this grand building was completed, the date was —. “Bright be the Shrine.”

And in another place it is written.³

این عمارت حضرت شاه جلال است
راست کرد حضرت شاه نعمت الله

“This is the building of the holy Shāh Jalāl. The holy Shāh Ni‘matu-llāh repaired it.”

The silver water vessels, which the Nawāb Sirāju-d-daulā presented, still exist in the Arba‘in Khāna. Mr. U. C. Batabyā linforms me that the gift was really a Kāṭrā or silver railing, and that it has disappeared.

II.—The Lakkhan Sēnī Dalān. This building was also erected by Shāh Ni‘matu-llāh. It is on the edge of the tank inside the Barī Dargāh. There is an inscription on a stone on the west wall of this building which runs as follows.

استاذ معظم حضرت مخدوم شاه جلال تدویر - از سید شاه نعمت الله مرتب
شده - چون جنوب رویه استقامت پشته نداشته بنابر بتولیت قبولیت * هیدت الله
عمار عظمی قدری جنبش کرده بود - محمد علی ساکن برجیه متصدی گری قرار
یافته - در استقامت (?) رام رام پسریکل راج را مقرر نموده بتاریخ ۲۲ رجب المرجب
سنه ۱۱۳۴ هجری مطابق سنه ۱۱۱۹ بنگله مرتب در آمد *

¹ Ghulam Husain, writing in 1786, speaks of there still being traces of the building (text, page 95).

² The inscription is in Ravenshaw, page 45. But I give it, because the word shrine is there translated “Mausoleum.” This gives a wrong impression, for the inscription says nothing about a tomb, and in fact Jalālu-d-dīn is not buried in Paṇḍuā.

³ This is not in Ravenshaw, &c.

The shrine of Shāh Jalāl Tabrīz was built by Sayyad Shāh Ni'matu-llāh. As the south-side wall of it was not strong, so during the time when Haibatu-llāh was Mutwallī, the building was shaken considerably. Muḥammad 'Alī, of Barjī, being appointed manager, he set Rām Rām son of Bīkal Rāj (this is not quite legible) to repair it. On the 22nd Rajab 1134 A.H., corresponding to 1119 Bengali, the shrine was re-built.

It would be interesting to know how the building came to be known as the house of Lakkhan Sēn, *i.e.*, Lakṣmaṇa Sēna.

III.—The Bhāṇḍār Khāna or Storehouse. This is a building facing the south, and was erected by Cānd Khān in 1084 (1673). The inscription is as follows (See Ravenshaw's *Gaur*, page 45).

IV.—The Tanūr Khāna, or House of the Oven. There is an oven in this house, which the saint is said to have put on his head and broiled meat in for his teacher. God knows if this is true. On the south side of one of the buildings there is an inscription recording that it was built by Sa'du-llāh in 1093 (1682). The inscription is as follows (not reproduced as it is in Ravenshaw, pages 45 and 46).

SOME ACCOUNT OF ḤAẒRAT JALĀLU-D-DĪN.

He was born at Tabrīz in Persia, and was a pupil of Shaikh Abū Sayyad of that city. After his teacher's death, he became the servant of Shaikh Shihābu-d-dīn Suhrawardī, and performed offices for him such as no other saint's pupil ever did. It is said that Shaikh Shihābu-d-dīn used to make the pilgrimage to Mecca every year, but that, being old and feeble, he could not digest the food that was provided for the journey. So Shaikh Jalālu-d-dīn put a dēghdānī (a stove¹) on his head and a pot in that, and always kept the stove alight, so that, whenever the Shaikh called for food, he could give him a hot meal. Shaikh Jalālu-d-dīn was on friendly terms with Khwāja Qutbu-d-dīn and Shaikh Bāhāu-d-dīn Zakaryā and came to Delhi in the time of the Khwāja. Shaikh Najamu-d-dīn Saghrī Shaikh l-islām, whose tomb is beside that of Barhānu-d-dīn of Balkh, was on bad terms with Jalālu-d-dīn, and brought an odious charge against him, and so troubled him, that he had to leave Delhi and go to Bengal.² When he came there he sat down by some water and then got up and performed his ablutions, and

¹ The utensil is still at Paṇḍuā, but is covered over with clay, and the original metal (copper) is not discernable,

² Abū-l-faḍl says that Jalālu-d-dīn was saved from the charge by the damangīrī of Bāhāu-d-dīn Zakaryā. This phrase probably only means support or assistance. See the story at length in the *Siyaru-l-Ārifīn* of Ḥamīd commonly called Darvīsh Jamāh. Bāhāu-d-dīn made the woman confess that she had been suborned by Najamu-d-dīn, and that Jalālu-d-dīn was purer than the water of life.

said to those about him that he was saying prayers for the Shaikhu-l-islām as he had just died. And so it turned out. After prayers he said to those present: As the Shaikhu-l-islām sent me out of Delhi, so has my Shaikh Mulla-bhai sent him out of the world.¹

The saint acquired property in Bengal and bequeathed it to faqirs and the poor. So the property is under the control of the shrine, and is known as the 'Twenty-two Thousand.' The Fātiha of the saint has from of old been held in the month of Rajab, and faqirs of all sorts, and many laymen assemble from the beginning to the 22nd of the month. And on the day of the Fātiha, *i.e.*, the 22nd, 22 cattle, 22 sheep, 22 maunds of rice, and other things in the same proportion are expended. And besides this, food is distributed to travellers throughout the year. The relics of the saint, *viz.*, his oven and a book in Nāgarī² characters, containing an account of his acts are preserved to the present day in the endowment. His tomb is in the port of Deo Maḥāl in Bengal. His death occurred in 738 A.H. (1337). The date is expressed in the words—

جلال الدين جلال الله جلال عارفان بود

“Jalālu-d-dīn was the glory (*jalāl*) of God, and the glory of saints.”³

But some people say that this is the date when he went away from Paṇḍuā, and did not come back again.

THE CHOṬĪ DARGĀH.

“The shrine of Ḥazrat Nūr Qutb is north-west of the Barī Dargāh and less than half-a-mile from it. Here the saint and many other holy men are laid at rest. His family too is buried here, their graves being west and north of his, and though they have been injured by time, the gate-way and the well still exist.

The Makān Arb'aīn or Cillakhāna. This is close to his tomb and on the west side of it. Although this building is old, the roof, &c., are new. On the east side there are three doors, and over each there is an inscription, which formerly belonged to some other building. The right

¹ According to the Siyaru-l-Ārifīn of Jarālī Kāmbū, this instance of second sight took place at Badaon. The same author mentions that Sultan Altamsh deposed Najamu-d-dīn when the falsehood of his charge was discovered, and appointed Bāhāu-d-dīn in his room.

² Mr. Batabyal informs me that the book is not in Nāgarī characters. It is Sanskrit, and is said to have been written by Hālāyudha the minister of Lakṣmaṇa-sēna. It ought to be published.

³ The letters appear to me to yield the date 737 and not 738. This chronogram has not, I believe, been published before.

hand one had belonged to a mosque built in 915 (1509) in the reign of Husain Shāh. The one on the left hand had belonged to a mosque built in the time of Naṣru-d-dīn Muḥammad Shāh. Neither of these inscriptions is very legible.

The middle inscription belonged to the Ṣufī Khāna of the saint, and is in small letters. The wording is as follows:—(See Ravenshaw's *Gaur*, p. 77).¹ It appears from this inscription that the Ṣufī Khāna was built in 898 (1493). The Muḥammad Ghaus mentioned in it was a descendant of Ḥazrat Nūr Quṭb.²

II.—The Sijda Gāh, or Praying Station. This is a wall close to the Makān Arba'in on the north side. On the top of this wall I saw the following long inscription. (Ravenshaw, pp. 50 and 74).³ It is clear that this inscription originally belonged to a mosque built in 884 (1479) in the reign of Yūsuf Shāh.

III.—Masjid Qāzī Nūr. This is a brick mosque with three cupolas near the tomb of Makhdūm Alāu-l-ḥāqq. The length from north to south is 36 cubits, and its breadth 16 cubits. There is no inscription. The people of Paṇḍuā say Qāzī Nūr is a different person from Nūr Quṭb.

IV.—The Mithā Talāo or Sweet Tank.⁴ Near the terrace of Nūr Quṭb's tomb, on the east side, there is an old masonry tank, that was dug in the time of Alāu-l-ḥāqq. On the east ghāt of this tank, at the right hand side, I saw an inscription that had formerly belonged to some mosque. It is as follows:—

کرد تعمیر مسجدی چون ماه
چاند بن دریا خان تک — مت شاه
گف — مت دارینج آن خرد در گوش
گوی واضح مکان معظ — م جاه

¹ The inscription is also given in *J. A. S. B.*, XLII, 289, and in Cunningham, *Arch. R.*, XV, 84. In Ravenshaw, and in *J. A. S. B.*, the inscription is wrongly described as coming from Gaur.

² His name appears in the genealogical tree in Ilāhī Bakhsh's MS., p. 161. Apparently he was the grandson of Nūr Quṭb's eldest son Rafī'u-d-dīn.

³ See also Cunningham, l. c., 85 and *J. A. S. B.*, LII, 276. The mosque was erected by an officer called the Majlisu-l-majālis. The same person built a mosque at Paṇḍuā in Hooghly, in 882, and another at Sylhet. He perhaps also built the Māldah mosque of 876.

⁴ I am not sure, if Mithā here means sweet. It is curious that there is a tank of this name in Vikrampur, Dacca, in the centre of Balāl Bārī. See Taylor's *Topography of Dacca*, 102. There is a tank too of that name in Rangpur. It was the scene of the last prank of Rajah Bhava candra, and the explanation of the name given to me was, that it was the tank of the final settlement or conclusion. May not the word be connected with Mithilā, the old name of Tirhoot?

Cānd, the son of Daryā Khān who was a subordinate of the King built a moon-like mosque. Genius whispered for the date, ' Say publicly Makān Ma'zam Jāh, (1170=1756).¹

I have heard that Cānd Khān and his father Daryā Khān held high offices, in Bengal, in the reign of Aurangzēb, and I also heard that Cānd Khān had come to Paṇḍuā on behalf of the Nāẓim of Dacca. Besides the Bhāṇḍār Khāna connected with the shrine of Ḥaẓrat Shāh Jalāl Tabrizī at Paṇḍuā, Cānd Khān built a mosque there in 1170 A.H., as is evident from the former inscription. At present this mosque has been destroyed. It is also probable that it is his father Daryā Khān is the same whose tomb is in the jungle east of Shāhpūr and who wrote the book called Kitāb Sarīrī. 'The Book of the Thrones.' (See p. 178 of MS., where the author describes the grave as a large tomb made of Sangmahak, i.e., touchstone or black basalt, and says that the Kitāb Sarīrī is a translation of the Simhāsan Battisī, or 32 Tales of a Throne).²

V.—The Copper Drums. In the shrine of Ḥaẓrat Nūr Quṭb there are two large copper drums which apparently were presented by Nawāb Qāṣim Khān Nāẓim of Bengal, as his name appears on their edge.

It appears that one of the descendants of Nūr Quṭb, was Sharīf Sarīfu-d-dīn, the son of Nizāmu-d-dīn, and that some Sultan, probably Husain Shāh, presented him with 47 villages rent-free for the support of the endowment. In course of time the documents became decayed and were shown by Shaikh Kabīr, the Superintendent for the time being, to Sultān Shujā'. The latter made a fresh grant to Shaikh Kabīr, dated 25th Sha'bān in the 22nd year of the reign (of Shāh Jahān) corresponding to 1058 (1648). This grant with Sultān Shujā's signature on it is still in the possession of the descendants of Nūr Quṭb. The older one has disappeared."

Ilāhī Bakhsh then gives details about Alāu-l-hāqq, the father of Nūr Quṭb, and about the saint himself. These seem to be taken from books, and not from local traditions, and contain little of importance in addition to the biographies given by Mr. Blochmann, *J. A. S. B.*, XLII, 261 and 262. However, I subjoin his account of Alāu-l-hāqq.

¹ The inscription is not given in Ravenshaw, &c. The date must be wrong, if Cānd Khān belonged to Aurangzēb's reign, and Ilāhī Bakhsh seems to have forgotten that the date of the Bhāṇḍār Khāna in the Barī Dargāh is 1084 or nearly a hundred years earlier. Perhaps the chronogram should only begin with Ma'zam. If so, the date would be 1059 (1649).

² Daryā Khān's translation is in our Library. See Catalogue of Persian MSS. p. 34, No. $\frac{D}{214}$ of Fasciculus I. It does not contain any notice of the author. The date given in the preface is 1084 (1674).

SHAikh ALĀU-L-ḤAQQ WA AD-DĪN.

He was the son of Asa'd of Lahore, father of Nūr Qutb, and the spiritual successor of Shaikh Sirāju-d-dīn Uṣmān, otherwise Ākhī Sirāju-d-dīn. He belonged to the wealthy and powerful classes, and they say that when Shaikh Ākhī Sirāj obtained the khalīfat (successorship) from Nizāmu-d-dīn Auliya and departed for Bengal, he represented that a man of knowledge and rank lived there, and asked how he should manage with him. Nizāmu-d-dīn replied, "Do not be anxious, he will be your servant, (Khādim)."¹ And so it turned out. They say that Shaikh Sirāju-d-dīn used to be carried about ¹ the country, and that cooked food used to be taken along with him, and that his servants would put a hot pot on Shaikh Alāu-l-ḥaqq's head, so that his hair got all burnt off. And he had to pass in this guise before the houses of his relations who were kings' ministers.

Shaikh Alāu-l-ḥaqq spent much. The king of the country was jealous, and said "my treasury is in the hands of the Shaikh's father, he gives to the Shaikh." So he ordered that the Shaikh be turned out of the city, and sent to Sōnārgāō. He was there for two years, but told his servant² (Khādim) to spend every day twice as much as before. He did so, and so the Shaikh spent very much, and yet no source of income was apparent. He had two gardens from his ancestors, of which the income was 8,000 *tankhas*, but some one seized them, and he made no remonstrance. He made presents without end, and used to say "I don't spend a tenth part of what my Makhdūm (Shaikh Ākhī otherwise Shaikh Sirāju-d-dīn) possesses."³

He died in 800 (1398), but in a book in the possession of the

¹ The word is *suwārī*, and may mean horseback, or a litter.

² I presume that this was an instruction to the servants left behind at Paṇḍuā.

³ I am not sure, if I have translated this sentence correctly. According to Ferishta, l. c, II., p 748, three lines from foot, it was Naṣīru-d-dīn Audhī, commonly known as the Lamp of Delhi, who comforted Shaikh Ākhī. Ferishta says that, though Shaikh Ākhī was deputed to Bengal by Nizāmu-d-dīn Auliya, he returned to Delhi after Nizāmu-d-dīn's death, and received his investiture and the khalīfat of Bengal from Naṣīru-d-dīn. Shaikh Ākhī, whom Ferishta calls Shaikh Ākhī Sirāj Parwāna, represented to Naṣīru-d-dīn his difficulty about Alāu-l-ḥaqq, and Naṣīru-d-dīn said to him in Hindi "*Tum upar, wē tal, i. e., you are superior, he is inferior.*" And then Ferishta tells how, when Shaikh Ākhī returned to Bengal, Alāu-l-ḥaqq at first treated him with disdain, but afterwards repented and humbled himself. It may be worth noting that Naṣīru-d-dīn and Shaikh Ākhī were fellow-countrymen, both coming from Oudh.

The date 800 is given as that of Alāu-l-ḥaqq's death in the *Riyāzu-l-auliya* of Bakhtāwar Khān, Brit. Mus. Catalogue, &c. 1745, p. 975.

Khādim of the shrine, I saw that his death was on 25 Rajab 786 (1384), and that the chronogram was

علاء الحق بحق واصل شد

Alāu-l-haqq, has attained God!

His Fātiḥa also is celebrated on 25 Rajab.

In the account of Nūr Quṭb we are told that the saint in obedience to his father's wishes used to draw water from the tank, and that at the present day the faqirs and others carry pots of water from the Mithā Talāo on his Fātiḥa, which is on the Shab-i-Barāt. This custom is known by the name of Pan-bharī = "Pāni-bharī, i.e., water-carrying."

He also quotes from some letters written by Nūr Quṭb. These are I suppose, the letters to which Abū-l-faḥl refers in his memoir of the saint (*Āin*, Jarrett's translation III, 371.)

Chronologists have differed as to the date of the saint's death. Some say he died in 808, and some say, in 848, and some say, in 813. and some say, in 851. The chronogram for the last is *Shamsu-l-hidāyat*.¹ In the book of the custodian of the shrine, it is written that he died on the 9th Zū-l-qa'da 818 (1415) and the chronogram is

نور بنور شد

"Light went to Light."²

But the author saw a small stone over the door of the kitchen in Nūr Quṭb's shrine with an inscription which probably relates to the death of the saint, and may have fallen down from his tomb and been placed where it now is.

The author then gives the inscription which is to be found in Ravenshaw, pp. 52 and 72, in Cunningham l. c., 33, and in *J. A. S. B.*, 271. But he gives the date as 18th Zū-l-ḥijja 833, instead of 28th Zū-l-ḥijja 863, as given by Blochmann. Ilāhī Bakhsh, however, must be wrong, for the king, Naṣīru-d-dīn Ābū-l-muẓaffar Muḥammad Shāh, whose name is mentioned in the inscription, did not begin to reign till 845. 863 is, I think, an impossible date for the death of a man who was a contemporary and fellow-student³ of

¹ "Sun of Guidance." This is the chronogram accepted by Blochmann, *J. A. S. B.*, XLII, 262. Ravenshaw gives yet another date, viz., 828.

² It is interesting to find that in the *Riyāzu-l-auliyā* of Bakhtāwar Khān, which was written in 1019 A.H., or 1679, the date of Nūr Quṭb's death is given as 818, and the day of the month is apparently 19th Zū-l-qa'da (p. 175). As Abū-l-faḥl seems to have copied his accounts of the saint from the *Riyāzu-l-auliya*, his 808 is probably a clerical error for 818. This last I look upon as the true date.

³ Ilāhī Bakhsh says they were both pupils of Ḥamīdu-d-dīn Ganj nishīn Nāgōrī. Abū-l-faḥl, *Āin* III, 367 (Jarrett's translation), mentions two Ḥamīdu-d-dīns of Nāgōr, but both belong to the 7th century A.H. Ferishta mentions that Khwāja Quṭbu-d-dīn Kākī died in 634 (1236) with his head on Ḥamīdu-d-dīn Nāgōrī's knees.

Sultān Ghayāṣu-d-dīn and whose father died (after the son was grown up) in 786, or at latest in 800. 833 and 851 are also, I think, too late, especially as Nūr Qutb's brother A'zam Khān is said to have been the Wazīr of Muḥammad Tughluk who died in 752.¹ There is, however, a way of explaining the inscription which is compatible with chronology, and with the suggestion that it belongs to Nūr Qutb's tomb. This is to take the date 863, as referring to the erection of the tomb by Latīf Khān, and not to that of the death of the saint. This is how Sir Alexander Cunningham, l. c., p. 85, has understood it, though he seems to have overlooked the fact that Blochmann's translation, which he has accepted, makes 863 the date of the death. Apparently it is only a question of punctuation. A little alteration in this will make the date refer to the erection of the tomb, and this is perhaps which we should naturally expect to be the case. For the object of the inscription seems to be to moralise on the inevitableness of death. This is enforced by the fact that the Sun of the Faith, &c., also tasted death. Possibly this Sun of the Faith, &c., may be Nūr Qutb, though one might have looked for a clearer reference to his name or title, viz., the Pole Star. It may mean the Prophet Muḥammad.

Ilāhī Bakhsh mentions that on one of the pillars of Nūr Qutb's tomb, on the right hand side, there is an inscription which says that the pillars were presented by Pīrzād Khān in the year 1000 (1592). I do not find that this inscription has been published anywhere, though Cunningham says² that the fifth pillar at the head of the sarcophagus has a Persian inscription. The poetry is illegible.

Ilāhī Bakhsh then proceeds to give notices of Shaikh Rafaqu-d-dīn and Shaikh Anwar, the eldest and younger sons of Nūr Qutb.

Rafaqu-d-dīn was celebrated for his humility, and used to say that he was of less account than a market-dog. His tomb is beside his father's. Shaikh Ānwar is said to have died a martyr at Sōnārgāō at the hands of Rajah Kans. He was famous for his generosity and used to have sheep fattened and killed for the faqīrs, though he did not touch the meat himself. His tomb is near his father and brother.

The author has already referred to him in his account of the place in Māldah called Sir Barī.

Between the tombs of the two sons, there are two graves which the custodians say are those of two brothers, who were devoted servants of Nūr Qutb. One was called Ma'īnu-l-islām and the other Āīnu-l-islām. It appears from the Riyāzu-s-salāṭīn (110) that a Shaikh Ma'īnu-l-islām Ābas was the father of Badaru-l-islām. Perhaps this is his tomb.

Shaikh Zāhid was the son of Rafaqu-d-dīn and grandson of Nūr Qutb. He had ten sons. His death was 17th Rabī'u-l-awwal 860 (1455). The chronogram is (860) حب دنیا چیزے نداشت

¹ See Blochmann, l. c. He admits the difficulty caused by this circumstance.

² I, l. c., 83.

“He regarded the world as of no account.”

His tomb is beside his father's on the south side, and his prayer-stone lies just to the west. Shaikh A'zam Shāh commonly known as Khān A'zam, was the elder brother of Nūr Qutb, and was a King's Vizier. As'ad of Lahore was the father of Alāu-l-ḥaqq and grandfather of Nūr Qutb. He was a King's Treasurer. Ādam Saudāgar was the father-in-law (?) of Nūr Qutb. His grave is near Alāu-l-ḥaqq's on the south side, and near it lies the inscription of Ādam Saudāgar. The tomb of Shāh Ikrām is outside of the enclosure of Nūr Qutb's tomb and on the east side. It is $8\frac{1}{2}$ cubits long and a little less than 5 cubits broad. When I asked who he was, one of the custodians said that he was a superintendant of the endowment. Near the tomb of Alāu-l-ḥaqq are the tombs of his wife and daughter, and of his wife's sister.

The genealogical tree of Nūr Qutb is as follows:—

It is not of sufficient importance to be published. The author mentions that descendants of Nūr Qutb are still living in the village of Eklakkhī, in the district of Burdwan. I do not know if this name is a reminiscence of the Eklakkhī mosque.¹

The author notices the tomb of a child, the son of a prince of Subzawār in Khurāsan named 'Ināyatu-llāh. He gives the inscription, but it is in Ravenshaw, p. 53. The child died on 1st Ramzān 1017 (1608). The people call it the tomb of the Kālā Pīr. The tomb is of black basalt, and near Alāu-l-ḥaqq. Here too is the tomb of Shēr Khān, a soldier in the service of the prince of Subzawār. The inscription is “Shēr Khān, son of Jōhar Khān.”

THE QUTB SHĀHĪ MOSQUE.

“This is near the shrine and lies north-east of it, in the jungle. It is built entirely of stone. The roof has fallen in, but the walls, &c., and pulpit are standing. Its length from north to south is 50 cubits and breadth 28 cubits, and it has ten cupolas. From the inscription it appears that it was begun by Makhdūm Shaikh, son of Muḥammadu-l-khālīdī, in 990 (1582), and was finished in four years. It also appears that Makhdūm was a descendant of Nūr Qutb.

The following inscription in Tughra characters is in two lines over the doorway.”

Sir Alexander Cunningham observes, l. 87. “There are three inscriptions belonging to this mosque, and that they are all *in situ*. Imperfect copies of the first and last have been given by Ravenshaw, who does not, however, notice the pulpit.”

¹ The property of the Twenty-two Thousand endowment is in the Burdwan district, and perhaps Nūr Qutb's is there also.

As Ilāhī Bakhsh has given all three, they are now printed from his MS.

بر بالاي دروازه

قال النبي صلى الله عليه وسلم من بني مسجداً في الدنيا بني الله له سبعين
قصرًا في الجنة بني هذا المسجد شيخ المعظم والمكرم مخدوم شيخ بن محمد بن الخالدي
صاحب مقام مقام قطب الاقطاب راس الاصواب قطب عالم خادم شيخ نور مد الله
ظله وامتنع له الله آثاره - المسمي هذا المسجد قطب شاهي - وتاريخه - مخدوم
عبد - راجي *

(Over the doorway.)

The Prophet (may the blessing and peace of God be upon him) has said, whoever in this world has erected a mosque for God, God will build for him in Paradise seventy palaces. This mosque was built by Makhdūm Shaikh, son of Muḥammadu-l-khalidī, who was of saintly virtue, leader of the pious, and servant of Shaikh Nūr (May his shadow continue). This mosque is called the Qutb Shāhī mosque and its date is Makhdūm 'Abaid Rājī (990 A.H.) = Makhdūm who is the humble servant, hopeful of God's mercy.

و این قطعه بر سر منبر مرقوم

قطعه

بین نیک این مرغ دایم بصحرا و محتاج * مگر سازد بمنقار نسیم دین منظر -
رسیدش کز کرم چون مستجابات این تاریخ * بآمد مسجد بنیان خورچ بر زیب از مخدوم¹
سنة ۹۹۳

(In front of the pulpit.)

See well this bird always a-field and in want; perhaps it adds melody with its throat (*lit.* beak) to the breeze of faith. This date was fixed by liberality accepted for it. بآمد مسجد بنیان خورچ بر زیب از مخدوم 993 A. H.

هذا باب المسجد الذي بني الفقير الحقير مخدوم شيخ بن محمد بن الخالدي -
عالي مقام سماء شمس الشريعة قمر كان الحقيقة هادي راه مرادة مخدوم المعظم
مخدوم قطب عالم تلالى الله بمضجعه - تاريخه اتمت باب مسجد - سنة ۹۹۳ -

The gate of this mosque was built by the faqīr Makhdūm Shaikh son of Muḥammadu-l-khalidī, who was a saint of high rank, sun of religion, and the moon of truth, shower of the way to hopes (May God illuminate his grave). Date 993 A.H.¹

¹ The words are illegible, and their meaning more or less unintelligible. As given above, they do not yield the date 993. Perhaps the words should read in the second line of the second couplet بامید مسجد بنیان زیب ز مخدوم, which yield 993.

THE EKLAKKHĪ MOSQUE.

“This is a brick building and has one lofty dome. Its length from north to south is 50 cubits and its breadth 46 cubits, the height of the wall is 17 cubits, and of the dome 27 cubits. There are four small doors on each side of the building, and at the top of the south door there is a small idol of stone, the face, &c., of which has been broken. There is no writing. It appears from this that the lintel must have belonged to some idol-temple. There are three graves inside and the Riyāzu-s-salāṭīn says that one tomb is that of Jalālu-d-dīn, the son of Rajah Kans, and that the other two belong to his wife and son. This mosque is north-east of the Qutb Shāhi mosque, and by the side of the high road. I imagine that the western tomb, which is the highest, is that of Sultān Jalālu-d-dīn, that the one to the east is that of his son Sultān Aḥmad Shāh, and that the middle one is the tomb of his wife.”

THE ĀDĪNA MOSQUE.

The author describes this mosque at some length, but I do not think that his measurements, &c., need be given after the elaborate descriptions by Ravenshaw and Cunningham, and in Vol. VII of the Historical Account of Bengal. He notices a masonry tomb near the pulpit, at the fourth dome and close to the well, which the Paṇḍuā people say, is that of a faqīr who lived in the mosque long ago.

He also describes the tomb¹ of Sikandar Shāh, the builder of the mosque, and observes that the tomb proper, or sarcophagus, which is inside of a square chamber, is 9 cubits long from north to south, and $7\frac{1}{2}$ cubits broad.

Ancient men of Māldah and Paṇḍuā say that Sikandar Shāh was of lofty stature, and that he measured four cubits according to the measurement of his own arm. Certainly they call him Iskandar Chōṭā.² It is worth observing that in front of the *chaukaṭh* (lintel) of the Adina mosque, there was a broken and polished idol, and that under the steps, near the pulpit, there was another broken idol, and that there were other idols lying about. So it appears that, in fact, this mosque was originally an idol-temple. Certainly Sikandar Shāh, the son of Shamsu-d-dīn Īlyās Shāh made a beautiful mosque. He built it in the month of Rajab 776 (1374), and the building was not completed before the founder was struck down by the spade of death. On the east side of the high road, over the false (naqli) door, and behind the pulpit, there is

¹ According to Dr. Taylor, Sikandar was buried in Goalpāra, in the vicinity of Jāfarganj, l. c., 109.

² Perhaps this means Alexander the Younger, and not Alexander the Less.

the following inscription very beautifully written in the Tughrā character and in one line.

The text has already been published by Blochmann, *J. A. S. B.*, XLII, 257. But as there is a word near the beginning which Mr. Blochmann left doubtful, and as Ilāhī Bakhsh reads the date differently from Mr. Blochmann, I produce here the former's copy, and also his note on the doubtful word. He thinks it may be Al jāma', i.e., the cathedral mosque.

کتابہ

أمر ببناء هذه العمارة المسجد الحيا (* الجامع) في الدولة السلطان الاعظم
اعلم اكرم اكمل السلاطين العرب والعجم الواثق بتأييد الرحمن ابي المجاهد سلطان
سكندر شاه بن الياس شاه السلطان خلد خلافته الى يوم الموعود كتبه في التاريخ رجب
سنة ست وسبعين وسبعمائة (٧٧٦) -

It was ordered to build this mosque in the reign of the illustrious king, who is most learned, respected, and perfect amongst the kings of 'Arabia and 'Ajam, who hopes for help from God, Abū-l-majāhid Sultān Sikandar Shāh son of Īlyās Shāh Sultān (May God preserve his throne till doomsday). Date inscribed to commemorate the building, 776 A.H.¹

As regards the date, I am unable to come to any conclusion. Buchanan had it read to him as 704, and this is no doubt what is on the stone. That is, the Arabic word for the numeral is Sab'a (7) and not Sab'ain (70) as the facsimile in Ravenshaw, p. 70, shows. Ilāhī Bakhsh admitted this to me when I saw him at Māldah, but remarked with truth that the date 707 was quite inconsistent with the chronology of Sikandar's reign. There is certainly a *six* in the inscription, but Blochmann has taken this to refer to the month, and in this he seems supported by the words *fīu-t-tārīkh*, which would lead us to expect to find the day, and not merely the month of erection. On the other hand Ghulām Husain must have read the six as relating to the year, for he gives the date as 766. He was obliged to make it 766 instead of 776, because his idea was that Sikandar died in 769. It may be remarked, too, that 776 is more consistent with Sikandar's not having been able to complete the mosque than 770, for it seems that he reigned up to 792, though his latter years were troubled by his son Ghiyāsu-d-dīn. As the word in the inscription is Sab'a, i.e., 7, and not 70, might it not be that the engraver wrote six, seven and seven hundred, i.e., 776? I suppose it would be a grammatical error to write the date in this way, but then Mr. Blochmann tells us that there are numerous such errors in the Bengal

¹ Note by Ilāhī Bakhsh:—

The word الحيا can read as الجامع, and also may mean 'to include,' 'to embrace.'

Arabic inscriptions. They often consist, he says,¹ of “wrong constructions of the Arabic numerals.” He does not say that they mis-spell them.

SATĀĪSGHARA.²

This is also described at some length, but the author has not been able to add much to our knowledge of the origin of the place, &c. It was surrounded with jungle in his time.

He describes the remains of Baths at the place, and suggests that these may be the Baths, or Hauz, which, according to the Riyāz, Shamsu-d-dīn Īlyās constructed in imitation of the Hauz-i-Shamsī of Delhi.³

He also notices the beautiful tank at Satāīsghara, and says it is known by the name of Naṣīr Shāh's tank.⁴ This, I suppose, must be the Nāsiru-d-dīn Abū-l-muẓaffar Muḥammad Shāh, who reigned from about 846-864, and in whose time the inscription now in the kitchen of Nūr Quṭb's shrine was put up. He succeeded to the dynasty of Rajah Kans, and restored that of Shamsu-d-dīn Īlyās Shāh. If it was he who made the tank, then the probability is increased that the Baths were made by his ancestor, for he would naturally revert to the palace of his forefathers.

In connection with Satāīsghar, Ilāhī Bakhsh notices Makhdūm Shaikh Raja Biyābānī (King of the Wilds),⁵ who was a saint of great fame in the time of Īlyās Shāh. He says he died in 754 (1353), while the king was being besieged by the Emperor Fīrōz Shāh, and then, following the Riyāz, p. 97,⁶ he tells how Īlyās Shāh came out of his fort, disguised as a faqīr, and paid the last honours to the saint, and returned without the Emperor being aware of it.

Ilāhī Bakhsh throws no light on the situation of Ekdālā,⁷ only remarking at p. 256, and apparently without authority, that Ekdālā was near Gaur. See note, Appendix A., pp. 227 and ff. He intended to give particulars of the site of Makhdūm Shaikh's tomb, but has left them blank in his MS. He notices Dēvṭolā, but gives less information about it than Cunningham, l. c., 94. He only says that many saints are buried there, and that a Cillakhāna of Jalālu-d-dīn Tabrīzī is there.

Among places of minor importance, are noticed, Kaṇḍārun, where is the shrine of the saint Nūr Jahān, Kātīgāñ, the original home of the

¹ J. A. S. B., l. c., 257 note.

² The name is perhaps Satāīsh ghar, the 27 houses.

³ See the Riyāzu-s-salāṭīn. Persian text. Bib. Ind, p. 96, and J. A. S. B., XLII, 255.

⁴ According to Ravenshaw, p. 67, the local tradition is that the tank was made by Arjuna Pāṇḍava.

⁵ Such may be the meaning of the title, but more probably the name is connected with Rānī Bahānī, the foundress of Ekdālā. See Taylor's Topography of Dacca, p. 115.

⁶ See Appendix A. Note on the site of Ekdālā.

⁷ It may be noted that the Fīrōzpūr mentioned in the Riyāz, p. 96, as the place where the Emperor encamped, is a ward in Old Māldah.

famous Gōpālbhōg mangoes, the Dargāh of Pīr Ḥusain near Māldah¹ where there is a stone with an inscription of Ḥusain Shāh, dated 10th Zū-l-qa'da 899 (13th August 1494). The author gives the inscription, but it has already been published, being one of those discovered by Mr. Westmacott. See *J. A. S. B.*, XLIII, 301. At a place called Jaharpāl (?) and also called Baglahagī (?) and which is on the east bank of the Mahānanda there are two inscriptions, viz., one of 918 (1512) of Ḥusain Shāh's time, and another of 930 (1524) of Nāsiru-d-dīn's time. Both of these have been printed in *J. A. S. B.*, 1. c., pp. 305 and 306. The author says he saw them near the house of Manglū Khān, deceased, who was a descendant of Ibrahīm Adham of Balkh, and that the bones of a saint named Shaikh Sirāju-d-dīn are there, enclosed in a small box. Formerly the shrine of the saint was opposite Manglū's house in a place where the river now is, but the men of the neighbourhood were warned by the saint in a dream to take up his bones and put them where they now are. The author gives both the inscriptions, but it is unnecessary to republish them. Under the head of the Karbala, the inscription from Khalf Khān's mosque, dated 935 (1528-29) is noticed. See *J. A. S. B.*, 1. c., pp. 307 and 308. The stone is now on a tomb at the Dargāh of a saint called Lankapat (the Nankapat of the *Journal*). The Ḥusain Shāh inscription of 914 (1508) (*J. A. S. B.*, 1. c., 305) is also given. He states that this inscription had belonged to a Jamā mosque built by Ḥusain Shāh. That mosque is now destroyed, but one Raḥīm Dalāl built, in 1277 (1860) a small mosque on the site of the old one, and placed the old inscription on it. The stone is on the right side of the door of the new mosque. He gives the village of Shāhmaṇḍī near Masjidbārī as the site of this mosque. He gives the inscription which is of the date 914 (1508), but it has already been published, *J. A. S. B.*, XLIII, 305, No. 13.

At page 178 he describes the tomb of Dariyā Khān,² which has already been referred to, and on the next page he describes an inscription which he found lying in some heavy jungle near another tomb in the neighbourhood. He says that he read it quickly, but that the words were as follows:—

کتابہ

بني هذا الباب الحصن الحصين في حماية السلطان ابن السلطان غياث الدنيا
والدين ابي المظفر محمود شاه السلطان بن حسين شاه السلطان بن سيد اشرف
الحسيني ابي الملقجي بفضل الهي المشهور بالعبد شاه وبالعبد البدر خلد الله ملكه
وسلطنته - سنة ثلث و اربعين و تسعمائة -

Translation.

This strong gate was made with the help of the Sultān who is ruler of this world and the next, Abū-l-muzaffar Maḥmūd Shāh, son of Ḥusain Shāh son of Sayyad Ashrafu-l-ḥusainī, whose prayer is accept-

¹ At Cak Bād ?

² He also gives a genealogical tree of Dariyā Khān's family.

able to God, and who is commonly known as ‘Abd Shāh and ‘Abdu-l-badr (May God preserve his throne). Date 943 A. H.

The inscription is of the time of Ghiyāsu-d-dīn Abū-l-muẓaffar Muḥammad Shāh, and so far as I know has never been published before. The date is 943 (1536), and it will be seen from Blochmann’s table, *J. A. S. B.*, XLII, 310, that no inscriptions of this king of later date than 941 have been published.

At page 180 the Gōlābāri inscription of 910 (1503-4) published, *J. A. S. B.*, XLIII, 304, is given.

Under the head of Gōāmāltī,¹ page 183, a place about six miles south of English Bāzār, and which was the residence of Mr. Creighton, a very early inscription is referred to, which, I believe, has never been noticed before. It belongs to the year 711 (1311). Unfortunately, Ilāhī Bakhsh does not give a copy of the inscription. His words are—

“Near the (abandoned) indigo factory of Gōāmāltī, and to the east of it, there is a minār² in good order, and a ruined mosque. The mosque was built in the time of Sultan Bahādur Khān as the inscription shows, which is now lying at the factory.

Near the same mosque, at the east side there was a Khairāt Khāna (Poor-house) of which the remains still exist. North of the Factory at the distance of ten or twelve *rassies* (5 or 600 yards) on the west side of the high road there is a stone sarcophagus. Probably this belonged to some saint or king, and the English, who dig up tombs with large stones, may have thrown it here. There is nothing written. In that neighbourhood there are also many other remains of old buildings and marks of former populousness.

At Lakhīpur, on the west bank of the Paglā, there is a tomb of Sayyad Aḥmad of Māltipūr, who was a great saint, and of whom many wonderful tales are told. His wife is buried beside him, and near at hand is the tomb of his barber.

Khāspūr, otherwise Tāṇḍā, was a town in old times. In 972 (1564) Sulāimān Kararāni abandoned Gaur on account of its climate, and

¹ The only Gōāmāltī inscription hitherto known appears to be one of 894, (1489), and belonging to the reign of Fīrōz Shāh II. It was discovered by Mr. Westmacott, *J. A. S. B.*, XLIII, 299. It is just possible that the inscription to which Ilāhī Bakhsh refers is that upon bricks now in the Indian Museum, described by Cunningham, l. c., 72. Bahādur Shāh was called Ghiyāsu-d-dīn as well as was the son of Sikandar. But Ilāhī Bakhsh speaks of the inscription as being on a stone.

² I suppose that this is the minaret mentioned by Francklin, and the “pinnacle” of Mr. Westmacott’s description. Bahādur Khān, or Shāh, reigned for 38 years, according to the Riyāz, p. 90. According to Mr. Blochmann, *J. A. S. B.*, XLIII, pp. 288–290, he reigned from 1311 (711), if not earlier, till about 731 (1331), and was called Ghiyāsu-d-dīn.

made Tāṇḍā the seat of government. It quickly became full of buildings, but in 983 (1575) Man'am Khān Khānān went back to Gaur on account of the mosques, &c., there. About 1242 (1826) the place was destroyed by floods, and disappeared into the river. Now-a-days it lies as a heap of dust about a mile from Lakhīpūr. Tāṇḍā used to be famous for Khajakhas (ladles ?).''

THE CITY OF GAUR.

The introduction to the account of the antiquities of Gaur is mainly taken from the *Riyāzu-s-salātīn*, page 28, but there are some differences. I shall, therefore, allow the author to use his own words.

The city of Gaur is one of the oldest of cities, and was once the seat of government. Now it is in decay. It lies south of English Bāzār at a distance of twelve miles, on the east bank of the Bhāgīrathī. They say when Fīrōz Rai, the king of India was routed by Rūstam, he fled to the hills of Jhār Khaṇḍ and died there. Rūstam, who was wearied out by his pursuit of Fīrōz, bestowed the sovereignty of India on a Hindu named Sūraj. Sūraj became a great monarch and ruled over the Deccan and Bengal, and he is the same as the Sūraj who planted Kanauj. After him, his son Bharāj became king, but in his time disturbances arose. At last a Brahman by name Gandār,¹ marched from the Sivāliks and became victorious. Then in the end of his reign one Singaldīp marched from Kōch Bihār and conquered the whole of Bengal and Bihār and founded the city of Gaur, about 1017 years before the Hijra era.² And as this was the name of the capital, so it became the name of the whole of Bengal. Then, after a lapse of years, in 450 A.H. (1058) Rajah Lakkhan Sēn or Lakman Sēn obtained the sovereignty of Bengal, and embellished Gaur, so that it became known by his name and was called Lakhnautī. But still this name had less currency. Then in 945 (1538) Humāyūn, the son of Bābar, came to Bengal and rejecting the name of Gaur on account of its semblance to the word for a grave, called the city Jannatābād. But this name too, did not last long. Then in 983 (1575), when 2000 years had elapsed since the founding of the city (1017 + 983), in the time of Man'am Khān Khānān, the Nāẓim of Bengal, in the reign of Akbar, such a terrible pestilence befel the city that thousands died daily. At last the living were wearied of burying the dead and flung them into the river, and such a stench arose that no one could remain in the city. In short, in the space of a year, the city became deserted, and full of jungle. Then in 1049 (1639) the river Ganges which from of old had flowed

¹ The *Riyāz* calls him Kaidār.

² About 395 B.C.

under the city diverged towards Rājmahāl, and the city which for 66 (1049 — 983) years had ceased to be a capital, now became altogether jungle and has remained deserted up till now.

دوان جائی کہ گل و گلشن و منزل و مکان بود
یبابان و پلنگ و بوزنہ و روباه صی بینم

“Where there were rose gardens and dwellings, now I see a wilderness and leopards, apes, and foxes.”

Alas for the ancient city of Gaur, which was so great a city of India, and had lofty ramparts and had an area, it is said, of fourteen *kōs*, and had many great buildings, and was a seat of sovereignty, and the residence of powerful kings. But the revolutions of fate are for our warning. In the course of one year,¹ it fell from its state of populousness and all this rose-like land is now the abode of monkeys and tigers. Only a few buildings which were of stone and exceptionally strong still exist, while the others which were of brick and plaster have fallen down. Their materials too, have been used for the construction of Māldah, English Bāzār, Murshidābād, &c. The following is the list of the buildings, of which traces still exist.

THE QADAM RASŪL.

This is a square one-domed building in the enclosure of the Fort. Its length from east to west is 24 cubits, and its breadth is the same. The Bhāgīrathī flows to the west of it at a distance of thirty *rassies* (about 1,500 yards). This building was erected by Sultān Naṣrat Shāh, the son of Sultān Ḥusain Shāh in 937 (1530). There is a Tughrā inscription in three lines over the doorway.²

Inside the mosque,³ under the dome there is a footprint of the holy apostle (may blessings be upon him), on a piece of stone. They say that this stone was formerly at Paṇḍuā in the Cillakhānā of Shāh Jalālū-d-dīn Tabrizī, and that it was removed by Ḥusain Shāh. The stone must have been brought from Arabia by the saint, or by some other holy personage. There is an inscribed stone on the south⁴ side of the enclosing wall of the mosque, which must have been brought

¹ Alluding to the pestilence of 1575, but the city was partially occupied again after that.

² The author gives the inscription, but it appears in Ravenshaw, p. 20, and in Cunningham.

³ When I was at Gaur, I found that the stone had been stolen.

⁴ Cunningham corrects Ravenshaw's "northern." He supposes, Archæological Report, XV, 61, that the inscription formerly belonged to the Tāntipāra mosque. I regret that in my paper on Francklin, *J. A. S. B.*, Vol. LXIII, p. 89 this has been printed Cāntipārā.

from another mosque built in 885 (1480). The inscription is as follows:—(It occurs in Ravenshaw, p. 22, and in *J. A. S. B.*, XLII, 277, but is produced here because the author was apparently able to read some words which Blochmann found illegible).

كُتَابُهُ

قال النبي صلى الله عليه وسلم من بني مسجداً لله بنى الله تعالى له سبعين قصراً في الجنة بني هذا المسجد في عهد السلطان ابن السلطان ابن السلطان شمس الدين والدين ابى المظفر يوسف شاه السلطان بن باريك شاه السلطان بن محمود شاه السلطان - بني هذا المسجد خان اعظم خاقان المعظم مرصاد خان اتابك رايت اعلى بتاريخ هـ ٩٠٥ م ١٥٠٠ رمضان سنة خمس وثمانين وثمانمائة -

Translation.

The prophet (may the blessing and mercy of God be upon him) has said, 'Whoever builds a mosque for God, God builds for him 70 palaces in paradise.' This mosque was built in the reign of Yūsuf Shāh Sultān, son of Bārbak Shāh Sultān, son of Maḥmūd Shāh by the illustrious Khān Mirṣād Khān on the 18th Ramazān 885 A. H.

Behind the dome of the Qadam Rasūl mosque, at the west side, there is a building of which the roof and some of the walls have fallen down. Inside are some masonry tombs in a ruined state. It is probable that these are the tombs of princes, or of high officers of Ḥusain Shāh and Naṣrat Shāh. West of the Qadam Rasūl there is a tank which is perhaps a remain of Sultān Jalālu-d-dīn. Certainly it is known by the name of the Jalālī tank.¹

THE TOMB OF FATH KHĀN.

This is outside of the enclosure of the Qadam Rasūl inside of a building which has been much destroyed, and has no inscription. They say that when Aurangzēb 'Ālamgīr, the king of Delhi, suspected Shāh Ni'matu-llāh of having instigated his pupil Sultān Shujā' to go to war, he deputed one of his soldiers, Dilēr Khān, a man who used to fight with a raging elephant, to cut off the saint's head, although in fact the latter had never advised Sultān Shujā' to go to war, but on the contrary had several times advised him against doing so. When Dilēr Khān with his two sons arrived in Gaur, one of the latter, whose name was Fath Khān, spat blood two or three times, and then gave up the ghost. The sorrowing father buried the body and prostrated himself before the saint. The event was reported to Aurangzēb, who after that placed confidence in the saint.

¹ The Riyāz, p. 116, mentions the Jalālī tank as one of Jalālu-d-dīn's works.

SHĀHU-LLĀH ŠĀHIB.

This saint was a contemporary of Nūr Qutbu-d-dīn of Panḍuā. His shrine is opposite the Qadam Rasūl, on the south side.

THE CĪKĀ MOSQUE.

This is 2 or 3 *rassies* south of the Qadam Rasūl and very old. The dome is large, and it is always inhabited by tigers. The common people call it the Cīkā Masjīd, and I heard from them that the place has been known from of old as the jail, and that it is also known by the name of the Cōrkḥāna. Near it there was another very small building. Probably the so-called mosque was not one, but was an office, or women's apartments, for what necessity was there for having small and big mosques close together? But as there is no inscription we cannot tell the real fact.

* * * * *

LUKĀ CURI (?).

This is a large two-storied building in the middle of the enclosure of the fort, and south-east of the Qadam Rasūl. This building is a gateway and very handsome, and is ornamented as if it were the Royal Entrance. On each side there are places for guards, and above them was a Naqārkhāna (place for beating drums). Probably it was erected by Husain Shāh or his son.¹

THE BĀIS GAZĪ (22 YARDS) WALL.

This is a lofty wall, west of the Qadam Rasūl and about 10 *rassies* off. The common people call it the Bāis Gazī, and also the Ghōr Daur (the Race-course). Those parts which are standing are about 44 cubits high.

THE KHAZĀNCĪ.

This is west by north from the Qadam Rasūl and about 20 *rassies* off. It is inside of the Bāis Gazī Wall. There is a plot of ground (ṭabaqā) here which the people of Gaur called the Khazāncī (Treasurer). In the middle of this plot there is a large tank,² and west of this tank there is a large terrace which bears marks of having been dug up. Probably it was the king's treasury. It is also known as the king's harem (Maḥal Sarāī).

¹ This is the "Eastern Gate" of Ravenshaw, p. 26, and which Mr. King calls the Lakkha Chhippi Gate. Perhaps the word is the Hindi Lauka, meaning brilliant, or illuminated.

² Locally known as the Taksāl Dighī, or Mint-tank.

THE GUMBĀZ GHŪSAL GĀH (THE DOME OF THE BATH).

It is a small square building with a lofty dome. It is on the west side of the tomb. It probably was a women's bath.

BANGLĀKŌṬ.

It is about 5 *rassies* from the Treasury and north-east of it, and about 15 *rassies* north-west from the Qadam Rasūl. The people of Mahīu-d-dīnpūr *alias* Maḥdīpūr call it Banglākōṭ. There is a tank there under the fort, and I saw fallen pillars and signs of stones having been dug up, &c. South-east of it there is a large tamarind tree, and about eight cubits from it, on the south, there are two masonry graves which have been excavated. From old people of Maḥdīpūr and from the Khādim of Qadam Rasūl, I heard that these were the graves of Ḥusain Shāh and his wife. They also said that the large sarcophagus which is lying near the village of Khaṛī, was inside of the tomb of Ḥusain Shāh, and had been lifted and thrown where it now is. About eight cubits south of the tombs there was a square enclosure, the walls of which were of variously coloured bricks. Inside of the enclosure, which was about 16 cubits square, there were several masonry tombs composed of coloured bricks, and about two spans in height. In my childhood I saw these tombs and the enclosure, and though somewhat decayed they were in a manner entire. In about 1263 (1846) these tombs and the enclosure were destroyed, and now hardly a trace of them is to be seen. This illustrious Banglākōṭ, with its trees and bamboos, &c., was from of old in the possession of the ancestors of Mīr Dōman, an inhabitant of Maḥdīpūr, who gave himself out to be a descendant of Ḥusain Shāh. He (shame on him) and his sons dug up the inscribed stones, and the coloured bricks and sold them, and thereby displayed their baseness.

به است دختر نیکو ز بد اطوار پسر

“A good daughter is better than a bad son.”

In 1281 (1863) I saw in the possession of Mīr Hānsā, the grandson of Mīr Dōman, a paper signed by the Nawab Mu'zam Khān, dated 1070 (1659) whereby 50 bighās rent-free in the village of Banglākōṭ were by order of Aurangzēb granted to Sayyad Āmbiā, the grandson of Sayyad Sultān, for the purpose of lighting the tombs of the kings of Gaur. And the lands are still in the possession of the family under this grant. Mīr Hānsā also pointed out a place north of Ḥusain Shāh's tomb and said that in Banglākōṭ, in that place, there were more than a hundred tombs of kings and their relations, but which were now in disrepair. Only here and there were holes marking where the graves had been.

THE MĪNĀR.

In the neighbourhood it is also known by the name of the Tīr Āsa Mandīr,¹ it is north north-east of the Qadam Rasūl and at a distance of about 25 *rassies*, and opposite Banglākōṭ, and outside of the fort. It was built by Sultān Fīrōz Shāh, the Abyssinian. The inscription and the lower stones have been dug up and stolen. The height of the Minār is about 50 cubits and its circumference about 54 cubits. On the east there is a tank which probably was also made by Fīrōz Shāh, who was reigning in 893 (1487).

THE GATE OF THE FORT, OR THE DĀKHIL GATE.

This is a large gateway north by west of the Qadam Rasūl, and about a mile away. It appears from the Riyāz that this lofty gateway was made by Husain Shāh. Near it, on the north, is a tank and from the latter an *ābgīr* (aqueduct) comes out on the east side and goes south a long way, and above it there are battlements. And from this gate on the west side, at a distance of about twenty *rassies*, near the Bhāgīrathī on the roadside, there is a large sarcophagus of black basalt, which is twisted to the west, and is in three fragments. There is no inscription. Some say that it is the tomb of Husain Shāh, and the Khādim of the Qadam Rasūl said that the tomb of Husain Shāh had been brought here from Banglākōṭ. South of it I saw another sarcophagus of hard stone.

THE KŌṬWĀLĪ GATE.

Also called the Salāmī Gate. It is near Maḥīu-d-dīnpūr or Maḥdīpūr, to the east, or the high road. To the south of it, at a distance of about twenty *rassies* is Balwa Dighī² (tank). There are battlements, east and west of the gateway, and on each side there are apertures for firearms. North of this gateway, at a distance of about half-a-mile, close to the old bridge, on the east side of the road, I saw a large stone with an inscription in unknown (ḥarf *khafī*) characters. Although it could not be clearly made out, so much I read that Sultān Maḥmud in 862 A.H. (1457) had built the gate of the fort.

(This is the inscription which Cunningham says he found, p. 57, and which Blochmann has translated, *J. A. S. B.*, XLIV, 289. It refers to the building of the bridge. Francklin speaks of two pillars with Sanskrit inscriptions in this neighbourhood).

¹ Such is the reading in the MS., but probably Tīr is a clerical error for Pīr. I was told on the spot that the name of the column was Pīr 'Aṣā Minār. 'Aṣā means a staff in Arabic and Persian, and perhaps is used here as equivalent to the Lāṭh of Fīrōz Shāh of Delhi.

² The Ballo Digbi of Ravenshaw, p. 36.

THE GŪNMAT MOSQUE.

This is about a mile north by west of the Kōṭwālī Gate, and near Maḥdīpūr, on the east side, and in thick jungle. Its length from north to south is 72 cubits, and its breadth 36 cubits. It had seven domes, all of which have fallen down.

THE MOSQUE OF RĀJBĪBĪ.

It is south-east of the Kōṭwālī Gate, east of the high road, between two tanks, one of which is called Baliyā (?) Dighī, and the other Kahaniā Dighī. It is a small mosque; the people of Gaur call it Rājībībī's mosque. It is 37 cubits long from east to west, and 29 cubits broad. There is a large dome, and on the east side three small ones.

THE MOSQUE OF DĪN CAK.

It has three domes. Near this mosque, on the north side, I saw a very small ruined building. Perhaps it was the tomb of the builder of the mosque and of his family.

THE PĪṬHĀWĀLĪ'S MOSQUE.

This was near the Kōṭwālī Gate, and north by west of it. It was a small mosque, and people called it the mosque of the Pīṭhāwālī (the mosque of the flour-grinding woman). In about 1278 (1861), it was dug up, and now no trace of it is left.

THE BEGH MUḤAMMAD MOSQUE.

About thirty *rassies* north of the Gūnmat Mosque, there was a small mosque of this name, and in front of it was a terrace of coloured bricks. Now the dome, &c., have fallen down. Opposite the mosque are the tombs of Begh Muḥammad and others.

THE DARAS MOSQUE.

Between Maḥdīpūr and Fīrōzpūr there is a piece of ground which the people call Darasbārī (the Lecture Room). In that place I saw a large mosque built of brick, with stone pillars. Its length from north to south was 65 cubits, and its breadth 38 cubits. From north to south there were seven rows, and from east to west 4—altogether 28 cupolas. Out of these, some towards the north were broken.

When in 1293 (1876) the jungle about this mosque was cleared in the presence of the author, a large inscription was found under a heap of rubbish. Its wording was as follows:—

کتابہ

قال الله تعالى وان المساجد لله فلا تدعو مع الله احداً وقال النبي صلى الله عليه وسلم من بني مسجداً لله بني الله له قصراً في الجنة مثله قد بني هذا المسجد

الجامع السلطان الاعظم مالك الرقاب و الامم السلطان ابن السلطان ابن السلطان
شمس الدنيا و الدين ابو المظفر يوسف شاه السلطان بن باريك شاه السلطان بن محمود
شاه خلد الله ملكه و سلطنته و افاض على العالمين احسانه و برة في سنة هجرة اربع
و ثمانين و ثمانمائة *

Translation.

God has said, He is proprietor of all mosques, so do not mention any name with God's name. And the prophet has said, whoever builds a mosque for God, God will build for him similarly a palace in paradise. This mosque was built by the righteous and great King, who is Sun of this world and the next, Abū-l-muẓaffar Yūsuf Shāh, son of Bārbak Shāh, son of Maḥmūd Shāh (May God preserve his throne, and may his generosity reach the whole world). Date 884 A.H.

(The inscription is referred to at page 76 of Cunningham's Archæological Report, Vol. XV., and a plate of it is given. But I am not aware if a reading and translation have been published).

THE KUMBHĪR PĪR, OR ALLIGATOR SAINT.

North-east of the Qadam Rasūl, there is a large masonry tomb, and near it there are other tombs. Some of these have so decayed that the bones of the dead may be seen inside of them. Here there is a large tank, the water of which is very clear, and which is inhabited by alligators.¹ From of old some people of the neighbourhood have believed that these alligators are the equipage of the saint, and some even hold that a large alligator there is the Pīr Ṣāhib himself. When a goat or a cock is presented as an offering, the Khādim rolls up the bones and skin into a mess, which they call a piṇḍā, and flings it into the tank, at the same time crying out 'Bābū Shāh Khizr, take the piṇḍā.' Thereupon a large alligator comes up from under the water to the bank, takes the mess and goes back again. Sometimes, though often called, he does not come, or if he comes, does not take the piṇḍā, even though intreated, and then the donor suspects that it is from some fault of his that the offering is not received. * * * * * I asked the Khādim, what was the name of the Pīr, and he said 'Bābū Shāh Khizr (Elias)'.

The Tāntīpārā Mosque. The author gives the dimensions of this mosque, &c., and says that the people of Gauṛ state that it was built by one 'Umar Qāzī, and that of two graves there, one is his, and the other his brother Zū-l-Qarān's. Then after noticing the Chamkaṭī Mosque, he notices a place which is called the residence of Dhanpat Saudāgar, or Cānd Saudāgar. The Laṭṭōnkī Masjid is also noticed, and the tradition mentioned that it was built by a dancing Girl.

¹ See Ravenshaw, p. 13.

The Gharī Khāna or Gong-house is mentioned. This was inside the Fort enclosures, and south of the Dākhil Darwāza. The gong was removed to the cutcherries at English Bāzār, and was broken in 1272 (1855). The author heard it struck from a distance of six miles, *viz.*, from the high bank of the Sāgar Dighī.

At page 204 we have a biography of Sayyad Shāh Ni'matu-llāh. He was a native of Karnaul, in the province of Delhi, and was a great traveller. In the course of his wanderings he came to Rājmahāl, where he was much honoured by Sultān Shujā'. At last he settled in the Fīrōzpūr quarter of Gaur where he died, according to one account, in 1075 (1664), and according to another, in 1080 (1669). At his shrine there is an inscription of Husain Shāh, dated 918 (1512). This is the inscription quoted in Ravenshaw, p. 88, Cunningham, p. 52, and *J. A. S. B.*, XLII, p. 295. We now know where it is to be found. In the same compound there is another inscription, the date of which is given by the author as 10th Zū-l-hijja 870 (1465), but which is given in Ravenshaw as 1st Zū-l-hijja 970 (22nd July 1563). It records the building of a gateway by Khān Jahān. The inscription as given by Ilāhī Bakhsh is as follows:—

کتابہ

بسم الله الرحمن الرحيم

قال الله تعالى انما يعمر مساجد الله من آمن بالله و اليوم الآخر و اقام الصلوة
و اتى الزكاة و لم يخش الا الله فعسى اولئك ان يكونوا من المهتدين - و قال النبي
صلى الله عليه و سلم من بنى مسجداً لله بنى الله له بيتاً فى الجنة مثله - عمارة هذا
المسجد الجامع فى عهد سلطان السلاطين سيد السادات مذبج السعادات - ارحم
المسلمين و المسلمين معلى كلمات الحق و الحسنات المؤيد بتأييد الدين المجاهد
فى سبيل الرحمن خليفة الله بالحجة و البرهان غوث الاسلام و المسلمين علاء الدنيا
و الدين ابى المظفر حسين شاه السلطان الحسنى خلد الله ملكه و سلطنته - بنى هذا
المسجد الجامع خالصاً مخلصاً متوكلاً على الله ابو محمد بن ابى على المخاطب
بخطاب مجلس المجالس مجلس منصور نصره الله تعالى فى الدنيا و الآخرة و تاريخه
الميمون فى الرابع عشر من شهر رجب المبارك رجب الله قدرة و شانه - سنة (چون
گوشه چارمدين كتابه هذا كه در انجا سنه و تاريخ بود ترقيده فروريخته است لهذا تاريخ
تعمير معلوم نشد) -

God has said, no one builds a mosque for God except he who has faith in God and in the day of resurrection, and who says his prayer and gives alms, and who fears not any one except God ; so that these are righteous people. And the Prophet has said, whoever builds a mosque for the sake of God

God builds similarly a palace for him in paradise. This mosque was built in the time of the pious and generous King Abū-l-muẓaffar Ḥusain Shāh. The mosque was built by Abū Muḥammad son of Abā ‘Alī, styled Majlisu-l-majālis (May God make him prosper both in this world and the next). The date of building is 14th Rajjab year—(The year is not given, as the portion of the inscription stone which contained the date is broken.)

“The word of God is that mosques belong to God. The builder of this gateway was Khān Jahān, 10th Zū-l-ḥijja 870.”

There was a Khān Jahān in Akbar’s time, but 970 (1563) seems too early for his being in Gauṛ, nor does one see why he should build a mosque or a gate there.¹ See Blochmann’s *Aīn*, No. 24, p. 330. Perhaps the 870 of Ilāhī Bakhsh is right. We find the title Khawājah Jahān in an inscription of 863. See Blochmann, *J. A. S. B.*, XLI, p. 108.

The Jāmi’ Masjid, i.e., the Small Golden Mosque of Ravenshaw, is described, and we are told that it is also called the Khawājah’s mosque, and that the tradition is that it was built by a eunuch. The author gives the inscription, and notices that the corner which contained the year has been broken away. See Cunningham, l. c., 75. He also notices two stone tombs opposite the mosque which may be those of the builder of the mosque and some relative, but which the country people say are fictitious (naql) tombs. He gives the inscriptions on the tombs; but they appear to be only extracts from the Qur’ān. See Cunningham, l. c., 76.

The tomb of a merchant named Aṣḥaṭ Khān Haft Qalmī is noticed. It is said that he lived in the time of Sultan Shujā’ and Nawab Jāfar Khān, and that he could write in seven different characters.

The Golden Mosque of Naṣrat Shāh is noticed. The inscription is now gone, but its date was 932 (1526).

In noticing the place called Rāmkhēl, the author says that he has given an account of Sonāton in his Tazkirah (autobiography?).

The account of Gauṛ closes at page 211 with a plan of the ruins.

At page 214 we have an account of Makhdūm Shaikh Ākhī Sirāju-d-dīn.² We are told that he was the first Hindūstānī who was nominated as a saint by Nizāmu-d-dīn Auliya of Delhi. He came to Gauṛ as his mother lived there, but he was originally from Oude. Mr. Blochmann says he died in 758 or 1357,³ but according to Ilāhī Bakhsh he died on 1st Shawwāl 743 (1342). The chronogram of his death is—

زود گو کان روز عید الفطر بود

¹ The inscription is in the Taghṛā character. I am not aware if this was used in Akbar’s time.

² Cunningham says l. c., p. 72, that this saint is best known by the name of Purānā Pīr, or the ‘old saint,’ but the title given to him by Ilāhī Bakhsh, p. 219, is Pīranpīr (equal to Pīr-Pīrānan) or saint of saints, in allusion to the fact that Alāu-l-ḥaqq and others were taught by him. Ferishta gives him the title of Parwāna (Inspector?).

³ *J. A. S. B.*, XLII, 260.

“ Say quickly, 'Twas 'Īdu-l-fiṭr day.”¹

The letters of the four last words give 743.

According to Ferishta, Bombay, ed. II, 737, four lines from top and 743, 5 lines from bottom, Ākhī Sirāju-d-dīn was the grandfather² of Nūr Quṭb, but perhaps he was only the spiritual father. Ferishta tells us that he came to Delhi young and ignorant, and that Fakhr-u-d-dīn Irādī (perhaps Zarādī), took him in hand and instructed him.

According to Ilāhī Bakhsh, the saint did not leave Delhi till three years after Nizāmu-d-dīn's death, and consequently in 728 (1327),

The two inscriptions of 916 referred to by Cunningham, l. c. 71, are noticed by Ilāhī Bakhsh.

At page 217 the Jāmi' Masjid is described. This is the Jan Jan Mīyān Mosque of Ravenshaw, 10. The author reads the inscription differently from Blochmann.³ His interpretation says nothing about the builder being a lady.

کتابہ

قال النبي صلى الله عليه وسلم من بني مسجداً لله بنى الله له بيتاً في الجنة
مثله - بني هذا المسجد الجامع في عهد السلطان ابن السلطان غياث الدنيا والدين
ابى المظفر محمود شاه السلطان بن حسين شاه السلطان خلد الله ملكه و سلطنته
(some words illegible left out.) و ادام الله معاليها في سنة احدى و اربعين و
تسعمائة - (٩٤١) -

Translation.

The prophet (may the blessing and peace of God be upon him) has said, whoever builds a mosque for God, God will build for him similarly a palace in paradise. This mosque was built in the time of the King Abū-l-muẓaffar Maḥmūd Shāh son of Ḥusain Shāh (may God always preserve his rank) in 941 A.H.

At page 222 we have a notice of Bahrāl where Nawab Sirāju-d-dīn daula was arrested through the instrumentality of Dān Shāh, a faqīr. Dān Shāh's resting place or *takiya*, is there, and his tomb is a mile away, on the river bank.

Gangā Rāmpūr. This lies north-west from English Bāzār at a distance of eight miles. It was a city in old times, and there are still traces of buildings there. Ḥaẓrat Makhdūm Shāh Jalālu-d-dīn Tabrīzī had his *Takiya* there. The people there narrate to the effect that Rajah Lakṣmaṇa Sēna, the last Hindu King of Bengal, had his capital here. (This appears to be the Gangārāmpūr mentioned by Cunningham, Archæological Reports, Vol.

¹ This is an ingenious chronogram for it gives the day and month as well as the year of death, the 'Īdu-l-fiṭr occurring on 1st Shawwāl immediately after the Ramẓān.

² At page 85, l. c., Cunningham incorrectly quotes Blochmann as saying that 'Alāu-d-dīn was the son of Shaikh Ākhī. See *J. A. S. B.*, XLII, 261.

³ *J. A. S. B.*, XLI, 339.

XV, 45, and described as a small village south of Māldah. General Cunningham found there an inscription dated 647 (1249).

The rest of the volume from pages 226 to 495 is occupied with a history of Bengal, but I do not think that it contains anything new or valuable. It seems to be in great measure compiled from the *Riyāzu-s-salātīn*, the *Siyaru-l-mutakhkharīn*, and Marshman's History of India. The only things I noticed in it was a reference at page 246 to rupis of Taghral Shāh being occasionally picked up in Gaur, an account and representation at pages 285, and 286 of Sikkās of Maḥmūd Shāh which the author had seen, and which bore the date 944 (1537), and a copy at page 327, of Sultan Shujā's seal.

CONCLUSION.

I have now finished my analysis of the Bengal portion of the *Khurshid Jahān Numā*. It will be seen that, so far as publication is concerned, *Ilāhī Bakhsh* has been anticipated with regard to most of the inscriptions. Apparently the only entirely new inscriptions are five in number, *viz.*, one of 913 at page 133 of MS., one of 1170 (qr. 1059) at page 153, one of 1000 at page 158, one of 943 at page 179, and one of 711 at page 183. At page 206 we have an inscription which is not new, but of which the date is given as 870 instead of 970, as in Ravenshaw.

The dates of the saints' deaths, &c., *viz.*, 738 for Jalālu-d-dīn Tabrizī, 786 for 'Alāu-l-ḥaqq, and 818 for Nūru-l-ḥaqq are new, and so are the chronograms which express them. Much of the information too about the saints and their shrines is new. At page 246 we have a reference to coins of Taghral Shāh, and at page 286 we have a description of a coin of Muḥammād Shāh, dated 944, which seems to be new.

On the whole, I think, we must say that *Ilāhī Bakhsh* has done well, and that he deserves to be held in remembrance along with Ghulām Husain, Creighton, Francklin, Ravenshaw and Blochmann.

APPENDIX A.

NOTE ON THE SITE OF EKDĀLĀ.

In *J. A. S. B.*, XLIII, 244, there is a note by Mr. Westmacott, accompanied by a map, in which he endeavours to show that the Ekdālā of Bengal history was a place of that name in Dinajpur. But Mr. Westmacott did not actually see the spot, and after weighing the evidence it seems to me that there can be no reasonable doubt that the Ekdālā of history is the well-known place of that name in the district of Dacca. This Ekdālā is marked in Rennell's map, No. 6, of the Low Countries beyond the Ganges, under the name of Ekdālā, as lying about 25 miles north-north-east of Dacca, on the west side of the Bānar, near its confluence with the Lakṣmiā. The situation of this Ekdālā corre-

sponds with the accounts of the historians, for it has a river on one side and the Bhawal jungles on the other. Apparently the old fort stood at a place now called Dūrdūriā, eight miles above the modern village of Ekdālā, for it is mentioned in the Statistical Account of Bengal, V, 73, that there are the remains of a strong fort there. The fullest account of the place is to be found in the valuable book of Dr. Taylor on the Topography of Dacca, now unfortunately out of print. He shows both Ekdālā and Dūrdūriā on his map, and at pages 112–15, we have a detailed account of the place and of the traditions connected with it. He tells us that Dūrdūriā is on the opposite side of the river from Ekdālā, and that there are the remains of a fort there, and opposite to it (*i.e.*, on the Ekdālā, or west side), there are the foundations of a town said to have been built by the Buneā Rajahs. They are also said to have built the fort. He gives a description of the works, and notices the remains of a mosque known by the name of Shaikh ‘Alā’s, and which was probably erected by Sultān ‘Alāu-d-dīn (*i.e.*, Husain Shāh). The fort is known by the name of Rānī Bāri, and is said to have belonged to Rānī Bhabānī. Dr. Taylor adds, “From the depth of the river, and of the moats that surrounded it, this fort must have been a place of considerable strength, and in all probability it was the one in which Ilyās Shamsu-d-dīn, the Second (? the Third), independent king of Bengal, was besieged by the Emperor Firōz in 1353.” He then tells the story of Ilyās Shāh’s coming out of the fort to attend the funeral of Rajah Biyabānī, and suggests that this saint was a descendant of Rānī Bhabānī. This seems a valuable suggestion. The title of Rajah is a curious one for a Muḥammadan saint, and in all probability points to the fact, that he was a converted Hindu. Bīyabānī, means wild, or desert, in Persian, but it closely resembles the name of the Rānī, and it is likely that the two words are identical.

According to Ferishta, Bombay Ed. I, 262, and the Riyāzu-s-salātīn, p. 97, the river to which Firōz Shāh made his feigned retreat was the Ganges, but the Ganges is not near the Dinajpur Ekdālā, whereas in Dacca we have the river known as the Buriganga.

The description¹ by Ziyahu-d-dīn Baranī of the flooded nature of the country about Ekdālā, and his reference to the large mosquitoes, which it was thought by Ilyās and the Bengalis would prevent the Imperial Army from encamping, agree better with Dacca than Dinajpur. But I should think that the mere fact that Shams i ‘Afif, in his history of Firōz Shāh, p. 112, speaks of the islands of Ekdālā جزائر اكداله²

¹ Bib. Ind., Ed. 589.

² The proper spelling appears to be Akdālā. The first syllable reminds us of Akmaḥāl, the old name of Rājmaḥāl, and the two words may be connected. But the Ak of Akmaḥāl is written Āk.

is sufficient to show that the place was in Eastern Bengal. We know, too that the kings of Bengal, from the days of Lakṣmaṇa Sēna, used, like the Egyptians of old, to retreat to the marshes whenever they were in difficulty, and for this purpose they went to Eastern Bengal.

The question about the site of Ekdālā might be definitively settled by finding the tomb of Makhdūm Shaikh Rājā Biyābānī, for it was probably very near Ekdālā, seeing that Hājī Ilyās came out of the fort in disguise and attended the funeral, while he was besieged by Firōz Shāh. It is even said that he appeared before the Emperor, disguised as a faqīr, and saluted him, and returned, without being recognised. If, as Dr. Taylor suggests, the saint was connected with Rānī Bhabānī, his tomb may perhaps be found near the Dacca Ekdālā, or near Dūrdūriā, if it has not been washed away by the river. If he was a noted saint, it is curious that we hear nothing of his tomb being in Dinajpur or Māldah. Evidently Ilāhī Bakhsh did not know the site of this tomb, for he has left blanks in his MS. for the direction and distance. It would also be of importance to find out if there is any place in Dacca or Dinajpur known as Azādpur, which is said¹ to have been the name substituted by Firōz Shāh for Ekdālā. Mr. Westmacott could not hear of this name in Dinajpur,² nor have I met with it in the list of parganas in Dacca, though there is a place there called A'zampur.³

The only objection to the Dacca Ekdālā is that Ziyahu-d-dīn Barānī, Bib. Ind., Ed. p. 588, speaks of Ekdālā as being near Paṇḍuā. But he wrote in his old age, at Delhi, and apparently he had never visited Bengal and had no local knowledge. The vague expression "near Paṇḍuā" is hardly appropriate to the Dinajpur village, for that is about twenty-three miles away. Husain Shāh is said to have every year gone on foot from Ekdālā to Paṇḍuā, to visit the shrine of Nūr Qutb. This is quite consistent with his residence having been the Dacca Ekdālā, for Husain Shāh was a good deal in Eastern Bengal. He built a mosque at Sōnārgāō, *J. A. S. B.*, XLII, 295, and Dr. Taylor tells us, l. c. 115, that there are the remains of a mosque at Dūrdūriā which goes by his name.

¹ Shams Sirāj 'Afif's *Tārīkh Fīrōz-Shāhī*, Bib. Ind., Ed., p. 122.

² The Dinajpur Ekdālā is in pargana Dhanjar. The Dacca Ekdālā is in Kapasiā, but I do not know the pargana.

³ See Grant's Analysis, Fifth Report, 368.

APPENDIX B.

JALĀLU-D-DĪN TABRĪZĪ.

According to Blochmann, *J. A. S. B.*, XLII., 260 and 281, Jalālu-d-dīn Tabrīzī died in 642 A.H. or 1244. He does not give his authority for this statement, and I have not been able to find in the Persian lives of saints any mention of the date of Jalālu-d-dīn's death.¹ Indeed, it seems that the exact date must be unknown, for Jalālu-d-dīn apparently died in the Maldiv Islands—far away from his friends and countrymen. It has been seen that according to the guardians of the shrine, Jalālu-d-dīn was in Paṇḍuā till 738 or 1337, and that according to some, he did not die there, but went off to some other place. It would be singular if tradition gave him a later date than the real one, for ordinarily it exaggerates the antiquity of a saint or other great man. It is also clear from Ibn Batutah that a Jalālu-d-dīn Tabrīzī was living in Assam or Sylhet, in the reign of Fakhrū-d-dīn or between 739 and 750. I am indebted for this important reference to Mr. Blochmann, who in his turn got it from my dear friend Dr. Wise, *J. A. S. B.*, XLII., 281.² The reference there is to Lee's translation of the fragment of Ibn Batutah, and I have since then consulted the French translation by Defrènery and Sanguinetti. Ibn Batutah's account of his interview

¹ I have since found the date 642 in the *Khazīnatu-l-aṣfiyā* of Ghulām Sarwar of Lahore, I. 283 of Newal Kishor ed. Perhaps this was the source of Mr. Blochmann's statement. But Ghulām Sarwar is quite a modern author, as the chronogram of his book's title shows (1254 or 1839), and he gives no authority for his statement. He is the same man who gives the wrong date for Nūr Quṭb's death, and evidently he does not know much about Jalālu-d-dīn, for he makes no reference to his visit to the Maldives. The *Siyaru-l-arifīn* was written in the time of Humāyūn, and is apparently the source of Abū-l-faḍl's short notice in the *Ā'in* (Jarrett's translation III. 366). The *Siyaru-l-arifīn* is an account of thirteen saints of the Chisti order and, as Dr. Rieu observes in his Catalogue, the notices are arranged in chronological order. Jalālu-d-dīn is tenth on the list and after Bahāu-d-dīn and others. The writer evidently did not know the date of Jalālu-d-dīn's death for he does not give it, and only says that he left Bengal and went to the port of Dēo Mahāl, (*i.e.*, the Maldives). Abū-l-faḍl makes a similar statement and gives no date of death.

² It is difficult to say if Jalālu-d-dīn Tabrīzī is the same as Shāh Jalāl of Sylhet. The location of the latter might agree with Ibn Batutah, and it is singular that both accounts should mention a Burhānu-d-dīn. But the dates seem all confused. If 591 A.H. had been Shāh Jalāl's birth-day instead of the day of his death, he might have been Ibn Batutah's Jalālu-d-dīn, who lived for 150 years. In one place Ibn Batutah calls Jalālu-d-dīnu-sh-Shīrāzī, IV., 287, of French translation. This is probably a clerical error, or a slip of Ibn Batutah's. Ibn Batutah's book is unfortunately confused, and wanting in precision. He did not write it himself, but dictated it in after life to an African friend.

with Jalālu-d-dīn Tabrizī begins at page 215 of Volume IV. of the first edition of the French translation. He there tells us that after arriving at Sadkāwān, he set off for the mountains of Kāmrū, in order to see a holy person who dwelt there, viz., Shaikh Jalālu-d-dīnu-t-Tabrizī. He then describes how he found him and stayed at his hermitage for three days. He tells some wonderful stories about the Shaikh's pre-science, and fasting powers, but omits to tell us what we should like to know, viz., where he first heard about Jalālu-d-dīn, or the exact place where he found him. He mixes up his narrative of what he saw with what he afterwards heard from Jalālu-d-dīn's disciples, and omits to tell when and where he received these communications.

It is true that Ilāhī Bakhsh's account of Jalālu-d-dīn seems inconsistent with his having been alive in the 8th century of the Hijra, for he tells us that Jalālu-d-dīn came to Delhi in the time of Khwāja Qutbu-d-dīn, and was a contemporary of Bahāu-d-dīn Zakariyā. Now Khwāja Qutbu-d-dīn Bakhtiyār Kākī, who is the person meant, died in 633 according to Abū-l-faḥl, and in 634 according to Ferishta, and Bahāu-d-dīn died either in 665 or 666. Ferishta's references to Jalālu-d-dīn Tabrizī also imply that he flourished in the first half of the 7th century of the Hijra, for he describes¹ him as the friend of Bahāu-d-dīn, and as obtaining leave from Shihābu-d-dīn, Suhrawardī, to accompany Bahāu-d-dīn from Bagdad to India. However, he stopped on the way at Khwārazan, while Bahāu-d-dīn went on to Multan. He also mentions, l. c. p. 718, four lines from bottom that Jalālu-d-dīn Tabrizī came to Bagdad for the second time from Kharāsan, while Khwāja Qutbu-d-dīn was there, and gave him news of Ma'ūnu-d-dīn Cishtī. The two then went together to Multan, and eventually Qutbu-d-dīn proceeded to Delhi whilst Jalālu-d-dīn went off to Ghaznī. This must have been subsequent to the time when Jalālu-d-dīn set out with Bahāu-d-dīn from Bagdad, for when he and Qutbu-d-dīn came to Multan, they found Bahāu-d-dīn established there. It may be noted that Ferishta does not say that Jalālu-d-dīn was at Delhi with Qutbu-d-dīn. Ferishta also says l. c., p. 742, six lines from foot, that Nizāmu-d-dīn Auliya read, when he was twelve years old, with one Maulānā 'Alāu-d-dīn who had received his investiture from Jalālu-d-dīn Tabrizī, and that in after life he again fell in with this Maulānā and greatly honoured him. The Shaikh Nizāmu-d-dīn Saghrī, too, who according to Abū-l-faḥl and Ilāhī Bakhsh, had a quarrel with Jalālu-d-dīn was, according to Ferishta², a contemporary of Khwāja Qutbu-d-dīn, and was on bad terms

¹ Bombay, Ed. by General Briggs, II., 760, nine lines from foot.

² L. C. 760.

with him. On the other hand, Mr. Blochmann's date of 642 seems too early, as Shihābu-d-dīn, Suhrawardī, the aged preceptor of Jalālu-d-dīn, lived till 632. It is noteworthy that neither Ferishta nor Abū-l-faẓl gives the date of Jalālu-d-dīn's death, and that the latter puts him in his list not only after Bahāu-d-dīn, but after his son and grandson, and also after Nizāmu-d-dīn Auliya, who died in 725 A.H.¹ Abū-l-faẓl's list² appears to be in chronological order, so far as the saints of the Suhrawardī order are concerned, beginning with Bahāu-d-dīn Zakariyā. Of course all difficulties are removed, if we accept Ibn Batutah's statement that Jalālu-d-dīn lived to the age of 150. There can be no doubt, I think, that the Jalālu-d-dīn whom he saw was the Paṇḍuā Jalālu-d-dīn. He told Ibn Batutah that he was in Bagdad when the last of the Abbasides Al Musta'ṣim Billah was killed, and this occurred on 20th February 1258 or 14th Ṣafar 656.³ He must therefore have been at least between 80 and 90 when Ibn Batutah saw him. He describes him as being then very old, but he does not tell us when or where he died. He only says that *afterwards* his disciples told him that he had died at the age of 150. He also says that long after his interview with Jalālu-d-dīn, Barhānu-d-dīn told him in China that the saint was dead. The fullest account of Jalālu-d-dīn that I have seen is in the *Siyarū-l-arifin* of Ḥamīd Bin Faẓlu-llāh, commonly known as Darvish Jamālī, Brit. Mus., Catalogue, Or., I. 215, p. 354a. But he too, does not give the date of his death.⁴ On the whole I am inclined to think that the date 642 A.H. is wrong. It is possible that Jalālu-d-dīn has been confounded with another saint of Tabrīz named Shams-i-Tabrīz, who according to one account died in 645, and according to another, in 643. Curiously enough, Shams-i-Tabrīz had a pupil—the famous Sufī poet, named Jalālu-d-dīn Rūmī—and he took Shams-i-Tabrīz's name as his takhallus or *nom de plume*. Dr. Rieu mentions in his catalogue that Shamsu-d-dīn Tabrīz was the constant companion of Jalālu-d-dīn Rūmī from 642 to his death in 645. Jalālu-d-dīn himself died in Iconium in 672 A.H. See the *Majālisu-l-'ushshāq*, Brit.

¹ Āin Akbarī Text, II., 216.

² Abū-l-faẓl seems to have consulted the *Riyāzu-l-auliyā* of Bakhtāvar Khān, who wrote in the time of Humāyūn. Bakhtāvar's list is also in chronological order.

³ The date is given in Gibbon, &c.

⁴ He calls him Ḥaẓrat Shaikh Jalālu-d-dīn Abū-l-qāsim Tabrīzī, and devotes ten pages to him. The account begins at 183b of Or. 215. Brit. Mus. Catalogue, p. 354a. It is curious that the converted Hindu milk-man of Badāon took the name of 'Alī and wanted to go with Jalālu-d-dīn into Bengal. But I do not suppose he is the man who afterwards became 'Alī Shāh and indeed we are told that the milk-man remained at Badāon and became a great saint there.

Mus. Catalogue, I., 352. Shams is No. 25, in the biographies in the Majālis and the account begins at p. 82*b*.

The story of how 'Alī Mubārak came to erect the shrine of Jalālu-d-dīn is told in the Riyāzu-s-salāṭīn, pp. 94 and 95, and also in Ilāhī Bakhsh, pp. 253 to 255. It has been translated by Blochmann, *J. A. S. B.*, XLII, pp. 252 and 253. The substance of Ghulām Husain's account is as follows :—

'Alī Mubārak, the second of the independent kings of Bengal, was originally a servant of Malik Fīrōz, the nephew of the Emperor Ghiyāṣu-d-dīn Taghlaq Shāh, and consequently the cousin of Juna Khān Muḥammad Shāh. When the latter became Emperor (725) he made Malik Fīrōz his Lieutenant-Governor. Hājī Ilyās, the foster brother of 'Alī Mubārak, was "wanted" for some fault which he had committed, and 'Alī Mubārak was called upon to produce him. 'Alī Mubārak could not do so, and reported that he had absconded. Malik Fīrōz blamed him for the disappearance and bade him leave Delhi. 'Alī Mubārak went off towards Bengal, and on the way had an interview with Hazrat Jalālu-d-dīn and implored his assistance. The saint was pleased and said, "We have given you the province of Bengal, but build a shrine for us." 'Alī Mubārak agreed, but asked where he should build it. The saint replied, "In the city of Paṇḍuā, in a place where you will find three bricks, one over the other,¹ and under them a fresh hundred-leaved rose."² When he came to Bengal 'Alī Mubārak entered the service of Qadr Khān, and eventually became his General. Fakhru-d-dīn revolted against Qadr Khān and killed him, but 'Alī Mubārak thereupon assumed the title of Sultan and marching against Fakhru-d-dīn, defeated him and put him to death in requital of his having slain his benefactor. 'Alī Mubārak now struck coins, &c., under the style of 'Alāu-d-dīn, and in the intoxication of prosperity forgot his promise to the saint. The saint now appeared to him in a dream and said "'Alāu-d-dīn, you have become Sultan of Bengal, but you have forgotten my order." Next day search was made and the bricks, &c., were found just as the saint had said. So the shrine was erected there in the very place where its traces now remain.

In the Riyāz, the first interview with the saint is said to have taken place بعالم روبا and certainly this means in a vision or dream. But if, as the Paṇḍuā story is, Jalālu-d-dīn lived there till 738, the necessity for a miraculous vision does not appear. It seems to me that

¹ Probably what is meant is that the three bricks were set on end and leaning against one another.

² Though *Gul ṣadbarak* means hundred-leaved rose, Dr. King tells me it is the Bussorah or Damascene rose, and not the rose *Rosa centifolia* of Linnæus.

perhaps the words *‘ālm rōya* may merely mean that ‘Alī Mubārak had an interview with the saint, or Ghulām Husain may have made a mistake, or used an incorrect expression, for the Bibliotheca Indica text shows that there is a grammatical error in the passage. The subsequent vision is intelligible, for by that time (741), the saint had left Paṇḍuā. Mr. Blochmann translates here “one night Jalālu-d-dīn *again* appeared to him,” but the word *again* is not in the original. If we suppose that there was an actual interview, and that the Shaikh-l-islām, who turned Jalālu-d-dīn out of Delhi was Nizāmu-d-dīn Auliya, the whole story might hang very well together.¹ For it was in the first year of his reign that Muḥammad Shāh appointed Malik Fīrōz as his Naib, and this was just after Nizāmu-d-dīn’s death, *viz.*, 725.

Mr. Blochmann has represented the Riyāz as saying that ‘Alī Mubārak killed his benefactor Qadr Khān and then killed Fakhru-d-dīn in revenge for this. But whatever the sentence may mean grammatically, I think that Ghulām Husain meant to say that it was Fakhru-d-dīn, who killed Qadr Khān, and this is how Ilāhī Bakhsh has understood the passage.

The statement in Abū-l-faẓl that Jalālu-d-dīn’s tomb was in the port of Dev Maḥāl puzzled me for a good while. Then I found in Ravenshaw’s *Gaur*, p. 46, a statement that according to some people, the saint died on one of the Maldives. And I also found Blochmann, *J. A. S. B.*, XLII., 260, referring to the passage and saying that Bandar Dīn Mahall was either the Maldives or Dīu in Gujarat. Ilāhī Bakhsh’s statement that Dev Mehal is in Bengal is evidently merely a guess, and there can be no doubt that the Maldives are the place meant, Dev Mehal being merely a corruption of Mahaldīv, or Mahaldīb, which is the native name for the islands. The Maldives lie south south-west of India and not far from Cape Comorin.

Though we do not find that the name of Jalālu-d-dīn is known there, yet we find that the name of his country is known, and that the natives ascribe their conversion to a saint who came from Tabrīz in Persia. This seems strong confirmation of the story that Jalālu-d-dīn’s tomb is in the Maldives.

The following extract from Messrs. Young and Christopher’s account of the Maldive islands will be found interesting. I give it the more readily because the early volumes of the transactions of the

¹ But of course this is opposed to the authorities, and if Jalālu-d-dīn was exceptionally long-lived, as Ibn Batutah says, there is no difficulty in the chronology, and the Shaikh-l-islam may have been Najmu-d-dīn Saghṛa. We do not know when this man died, but he is said to have been deposed by Shamsu-d-dīn Altamsh. Apparently then Jalālu-d-dīn left Delhi for Badaon and Bengal not later than 633, (1236 for Altamsh died in that year).

Bombay Geographical Society are rather scarce. They are not to be found in the British Museum or the Library of the Royal Asiatic Society,¹ but are in the India Office Library.

Extract from Transactions of the Bombay Geographical Society.²

“They (the islanders) have a tradition that about 400 years ago, the Muhammadan religion was introduced amongst them by a man whose name was Tabrīz, or whose country was so-called. The probability is, that the latter was the case.

“The tomb of this person, which is pointed out in Malē, is held in great veneration, and always kept in good repair. Some time afterwards, Christians (doubtless the Portuguese) came there, and propagated the tenets of their faith, but they were soon expelled by one of their own chiefs, who belonged to Attol Zilla Don Matee, and who re-established Muhammadanism amongst them, on a secure footing. Tabrīz, they say, came from Persia; and they state that shortly after his death, some of his countrymen, who came in search of him, remained, and when they died, were buried on the south-east point of the island. From the Persians, the islanders learned many songs in the language of that people, which are still sung, although not understood. The tambourine, it was also said, was brought there by them. We visited the graves of the Persians, and counted about sixty, only two of which had inscriptions that were legible, and bearing date 994th year of the Hijra, which would make them 257 years old.³ One of these being in appearance less old than the other graves, it seemed probable that it was not the depository of the remains of any of the first settlers, but of those of one of their descendants. The Fandiarhee⁴ has many Persian manuscripts, but only one could be procured by us.”

Mr. Gray in his translation of the voyage of Pyrard of Laval has given an abstract of Young and Christopher's account, but he has adopted the faulty date of 1677, and has made some incorrect inferences there-

¹ The volume has since been found in the R. A. S. Library.

² Memoir on the inhabitants of the Maldiva Islands by Lieutenant J. A. Young, and Mr. W. Christopher, I, p. 54.

³ Messrs. Young and Christopher were on the island in 1834-35. Their figures are nearly right, for 994 A. H. is 1586 and 1834-257 corresponds to 1577. Mr. Gray seems inadvertently to have read 157 for 257, for he gives the English date as 1677.

⁴ The Fandiarhee is an officer next in authority to the Sultan, and who shares with him in the respect and veneration of the people. In him are united the two offices of head of the Church and Chief Magistrate. The reverence with which he is regarded, indicates the sincerity in them of the Muhammadan tenets. His decisions as Magistrate are always received with deference, and the natives in general shew that they entertain a high sense of the importance of his duties, particularly that of interpreter of the Koran, he being the only person amongst them who has a competent knowledge of the Arabic for a purpose considered so necessary (p. 70). (Ibn Batutah calls this officer Famaldārī. Perhaps the word comes from *fahm*, intelligence, but it seems more likely that it is a corruption of Faujdār. It may also be 'Amildār).

from. I, however, quote Pyrard's words: "Some sepulchres they hold sacred, and at them keep many lamps burning continually." To this Mr. Gray adds from Young and Christopher's account: "A remarkable object on the island¹ is a tomb erected over the remains of a person who is regarded by the natives as the most eminent of their saints. The building, which is surmounted by a cupola and a short spire, is thirty feet high; the gate, over which a lantern is placed, is of copper network (T. Bo. Geo. Soc., I, 63)."

Ibn Batutah does not mention Jalālu-d-dīn in connection with the Maldives. According to him, Muhammadanism was introduced into the island by a Muhammadan from Barbary named Abū-l-barkāt, and he tells a romantic and interesting story of how the conversion of the islanders was brought about. He also says that he saw an inscription on a mosque, which stated that the Sultan had embraced Muhammadanism at the hands of Abū-l-barkāt. Ibn Batutah was twice at the Maldives, but both occasions were before he visited Bengal and saw Jalālu-d-dīn. As Jalālu-d-dīn asked him about his travels, it may be that it was Ibn Batutah's account of the Maldives that induced Jalālu-d-dīn to go there. He may, however, have done so simply on his way to Mecca, which it is said he used to visit every year.

There is a curious similarity between Ibn Batutah's narrative about Abū-l-barkāt, and the account of Jalālu-d-dīn's success in the Maldives in the *Siyaru-l-ārifīn*. The latter tells that Jalālu-d-dīn broke down the idol temple, and that one-half of the customs (Bandar) was assigned for the support of his langarkhāna there. Ibn Batutah tells us that *one-third* of the customs (Bandar, which he explains by an Arabic phrase rendered by his French translators *entrepôt de la douane*) is given to travellers in gratitude for Abū-l-barkāt's delivering the island from the power of a demon. It is unfortunate that the exact date when Ibn Batutah visited Bengal is not known. He left Tangiers on 2nd Rajjāb 725 (14th June, 1325) and arrived in Bengal apparently about 741 (1341) when disputes were going on between Fakhr-u-d-dīn and 'Alī Shāh. In all probability the Sadkawan where Ibn Batutah landed is not Chittagong, but Sāt-gāon, the Jamuna which he refers to being one of the streams into which the Ganges separates at Tribēnī.

Though Ibn Batutah is a confused and credulous writer, yet, I think, it cannot be doubted that he saw a man in Bengal or Assam, who was called Jalālu-d-dīn Tabrizī. In his account of Delhi, Ibn Batutah says that he devoted himself for five months to the service of a saint named Kamālu-d-dīn 'Abdu-llah Alghārī. Perhaps this is the Kamālu-d-dīn Jaffarī mentioned in the *Siyaru-l-ārifīn* as a friend of Jalālu-d-dīn.

¹ This is Malē or King's island (so called from the residence there of the Sultan). It is the principal atoll or island of the group, and lies at their southern extremity.

Note on some Coins of the Koch Kings.—By E. A. GAIT, I.C.S.

(With Plate XXIV.)

[Read July, 1895.]

Several new coins of the Koch dynasty have recently come to light, and as very little is generally known regarding these coins, I propose to describe briefly the different specimens which I have seen. Marsden describes coins of Lakṣmī Nārāyaṇa and Prāṇa Nārāyaṇa only (MCCIII and MCCV), the dates on which he reads as Çaka 1649 and 1666 respectively. The symbol read by Marsden as a six is a curious figure closely resembling the English figure 5, and strangely enough, there can be no possible doubt that it is used to represent 5 on the coins under reference. The symbol in question is a common one, not only on Koch coins, but also on the coins of the Āhōm, Jaintiā and Tippera kings. It is not a six, as it often appears in conjunction with the usual symbol for that figure, *e.g.* on the coin of Çiva Simha given in Marsden (MCLIII), who in this case correctly reads it as a 5, and on a coin of Vijaya Nārāyaṇa of Tippera. Again in the case of many Āhōm coins, where we have a very accurate chronology apart from the testimony of coins, the dates on the coins agree perfectly with those recorded in the Burañjis if the symbol is read as 5, but not otherwise. So with the two Koch coins under discussion. The approximate dates of Lakṣmī Nārāyaṇa are 1584–1622 A. D. and of Prāṇa Nārāyaṇa 1627–1666 A. D. Now if the symbol be read as 6, the dates given above will utterly disagree with those on the coins, whereas if it be read as 5, the dates on the coins will be 1549 and 1555 Çaka, or 1627 and 1633 A. D. In this case, the latter will fall within the period during which the king whose name it bears reigned, while in the case of the former there is only a slight discrepancy which may be explained either by assuming a small error in the date assigned by tradition as marking the close of Lakṣmī Nārāyaṇa's reign, or by a mistake in the reading of the third figure. The latter is, I think, more likely for the reason given below.

There is a coin of Lakṣmī-nārāyaṇa in the possession of the Society,¹ the date on which is 1509 Çaka, and another coin of the same date has been described in the *Aruṇōdai* (an Assamese Vernacular Magazine) of March 1851. I have in my possession a third coin, also dated Çaka 1509. It will be noticed that the third figure in the specimen reproduced by Marsden is somewhat blurred, and I am inclined to think that the real date of this coin also is 1509 Çaka. There must in any case be some mistake about the date reported by Marsden to be on another coin of Lakṣmī-nārāyaṇa (No. MCCIV) which unfortunately has not been reproduced by him. He gives the date of the coin in question as Çaka 1659. Allowing for the misreading of the second figure this would be 1559, whereas the coin of Prāṇa-nārāyaṇa already referred to bears date 1555. Most probably, the true date on this coin also is Çaka 1509.

An earlier coin than either of the above was found some years ago in the Gāro Hills, and described in the *Journal*, Asiatic Society of Bengal, XLIV, page 306. This is a coin of Nara-nārāyaṇa, the second and greatest Koch King, and is dated Çaka 1477 (Plate XXIV, 1). I have procured two more specimens of this king's coins, both bearing the same date, but differing in the shape of the letters, while one of them has the word *Bhūpālasya* inserted after Nārāyaṇa (Plate XXIV, 2).

A careful search for coins of this dynasty has been in progress for some time past, but it has only resulted in the discovery of one new full coin, which has been presented to the Society by the owner, Babu Tanurām, Mauzadar of Hastinapur in Barpetā. The reading of this coin is :—

Obverse.—Çr Çr Raghu-dēva-nārāyaṇa-pālasya Çākē 1510.

Reverse.—Çr Çr Hara-gaurī-caraṇa-kamala-madhukarasya.

Particular interest attaches to this coin, because while the others all belong to Nara-nārāyaṇa or his descendants who ruled in the Western Koch Kingdom, this is the first specimen which has come to light which bears the name of a king of the Eastern Kingdom.² Raghu-dēva or Raghu Rāi as he is called in the *Vaṃçāvalī* of Rājā

¹ Procured for me two years ago by Babu Mādhav-candra Bardalai, Sub-Divisional officer of Barpeta, *vide Proceedings*, August 1893, page 146. [The date shown in the *Proceedings* (1069) is a misprint].

² For the genealogy of these kings, see my paper on the Koch Kings of Kāmarūpa, *Journal*, Asiatic Society of Bengal, LXII page 305. I take this opportunity to correct a misprint on the page in question; the date in the sixth line from the bottom should be 1658 A. D. and not 1558 A. D. The coin here referred to was exhibited to the Society in May 1895, *vide Proceedings* for that month.

Lakṣmī-nārāyaṇa,¹ came to the throne in 1583 A. D. So the coin was minted five years after his accession, and one year later than the coins issued by his contemporary, Lakṣmī-nārāyaṇa, the ruler of the Western Kingdom.

I now come to the half coins of the Koch Kings, regarding which there has been much misconception amongst numismatists. Only one such coin is mentioned by Marsden, who attributes it, on the authority of Tavernier, to a Rājā named Maton Shāh, whose territory is said to be situated "beyond the first range of mountains bordering Hindustan to the north."...

Another specimen is given in Prinsep's *Indian Antiquities*, Vol. II, page XLV (No. 6), where it is described as a Cachar Coin of Çr Girīca-candra-nārāyaṇa.

Several specimens of these half coins were procured for me by Babu Mādhav-candra Bardalai two years ago, and noticed briefly in the *Proceedings* for August 1893 (page 146). When touring in the Eastern Duārs last January, I found that some varieties of these coins are still common and succeeded in getting a few useful specimens from the villagers.

The difficulty which has hitherto been felt in identifying these half coins lies in the fact that the legends on them are incomplete,—the method of manufacture adopted being apparently to strike a full coin and then to make half coins by stamping out the centre. It is thus impossible to read the legend on any individual coin without some clue, but starting with the assumption that they are coins of the Koch Kings and knowing the legends which are usually found on the full coins, it is no longer difficult to see that the reading of all the half coins is as follows :—

Obverse.—Çr Çr mat (name of king) -nārāyaṇasya Çākē (date).

Reverse.—Çr Çr Çiva-carāṇa-kamala-madhukarasya.

No half coin contains the whole of this legend, but as the portion stamped out is seldom the exact centre of the coin, a comparison of one coin with another shows that the above is undoubtedly the correct reading of these coins. Unfortunately the names of the kings in whose reigns they were minted are nearly always incomplete, and it is seldom that more can be read from them than the last two or three letters. We can however identify some of them by comparing the terminal letters with those of the Koch rulers of the western kingdom,

¹ He is called Raghu-dēva in the inscription in the temple of Hayagrīva at Hājo, which is quoted in the paper mentioned in the last footnote, and which bears date Çaka 1505.

of whom a list is given in Hunter's *Statistic Account of Koch Bihār.* They are :—

Nara-nārāyaṇa	...	...	1534–1584 A. D.
Lakṣmī-nārāyaṇa	...	...	1584–1622 A. D.
Vīra-nārāyaṇa	...	...	1622–1627 A. D.
Prāṇa-nārāyaṇa	...	...	1627–1666 A. D.
Mada-nārāyaṇa	...	...	1666–1681 A. D.
Vasudēva-nārāyaṇa	...	...	1681–1683 A. D.
Mahēndra-nārāyaṇa	...	...	1683–1695 A. D.
Rūpa-nārāyaṇa	...	...	1695–1715 A. D.
Upēndra-nārāyaṇa	...	...	1715–1764 A. D.
Dēvēndra-nārāyaṇa	...	...	1764–1766 A. D.
Dhairyēndra-nārāyaṇa	...	...	1766–1771 A. D.
Rājēndra-nārāyaṇa	...	...	1771–1773 A. D.
Darēndra-nārāyaṇa	...	...	1773–1780 A. D.
Dhairyēndra-nārāyaṇa (again)	...	...	1780–1783 A. D.
Harēndra-nārāyaṇa	...	...	1783–1839 A. D.
Çivēndra-nārāyaṇa	...	...	1839–1847 A. D.

With these data, it would in any case seem probable that the coins (Nos. 3 and 4) referred to in the *Proceedings* for August 1893, were minted in the reign of Prāṇa-nārāyaṇa, and I have now procured another similar coin which places the matter beyond doubt, as the whole name (𑂣𑂰𑂩𑂰) is perfectly legible on it (Plate XXIV, 3).

The coin in the Society's Collection on which the termination of the king's name is 𑂣𑂰 is clearly a coin of Upēndra-nārāyaṇa (Plate XXIV, 4).

There remain a number of coins which show the termination of the king's name to be 𑂣, 𑂣𑂰 or 𑂣𑂰. As there are several kings whose names end with these letters, it is difficult to identify these coins with any degree of certainty, and it is not improbable that some were minted by one king and others by another. I have recently procured a coin on which the whole name Çivēndra-nārāyaṇa can be clearly read (Plate XXIV, 5), and another in which the letter preceding the 𑂣 seems to be *r* and not *v*,¹ so that it must be a coin of either Darēndra-nārāyaṇa or Harēndra-nārāyaṇa (Plate XXIV, 6).

Lastly there is a coin on which the termination of the name seems to be *āndra*, which does not fit in with any of the names of Koch Kings quoted above (Plate XXIV, 7). Another peculiarity about this

¹ The letter is similar to the Assamese *r*, in which the sign distinguishing this letter from *v* is a bar across the triangle and not a dot below it, as is the case in Bengali.

coin is that there is a small letter *s* above the *ndra*, the meaning of which is not very clear.

The above coins are all of silver, but I have also seen some copper coins; brass coins are also not unknown.

When commencing the discussion of these half coins, their identity with Koch coins, was referred to as 'assumed.' There can however be no doubt that they really are Koch coins, for apart from the fact that their language, character and legends are identical with those of the full coins of the Koch dynasty, we have seen that two of them bear the full names of Koch Kings (Prāṇa-nārāyaṇa and Çivēndra-nārāyaṇa). As already stated, they are still common in the Eastern Duars where they are well known as "*Nārāyaṇī* rupees."

It will be seen that the above account of the coinage of the Koch Kings is not very complete but it contains a notice of all the coins which I have hitherto met with. The search for other coins of this dynasty is still being continued, and it is hoped that in course of time more may come to light.

POSTSCRIPT.

Since the above note was written, I have had an opportunity of examining the collection of Koch Coins in the British Museum, which includes those described in Marsden's work.

There are in all, five coins of Lakṣmī-nārāyaṇa, and there is no doubt that the date on all of them is 1509 Çaka, although in one or two cases the third figure is somewhat defective.

There is, I find, a coin of Raghu-dēva in the Museum, similar in all respects to that noticed in the Society's proceedings for May last. The collection includes three full coins of Prāṇa-nārāyaṇa, two of which bear date 1555 Çaka; the date on the third coin is not decipherable.

The half coins of the Koch Kings are kept in a separate tray, which was originally labelled "Bhotan," but this was subsequently altered to "Kachār," presumably on the authority of Prinsep (*Ind. Antiq.* Vol. II. p. XLV). This tray contains several half coins not mentioned in the above note, *viz.*, of Mada-nārāyaṇa, Rūpa-nārāyaṇa and Dhairyēndra-nārāyaṇa. There are several coins in the collection with "āndra" on the termination of the King's name, and it is noted against one of them that it is reported by Jenkins (General Jenkins) to be a Bhotia forgery.

14th August, 1895.

E. A. G.

Some Notes on Jaintiā History.—By E. A. GAIT, I.C.S.

(With Plate XXIV)

[Read July, 1895.]

Although Jaintiā was an independent state up to 1835 A.D., its past history is almost a blank, and we know nothing of the causes which united the Syntengs under one ruler, while their neighbours and close congeners, the Khāsīs, preserved a democratic constitution, and remained split up into numerous petty states, nor of how the kings came under Hindū influence and eventually left the hills and settled down at Jaintiāpur in the plains tract north of the Surma river. Neither is it known how the tract in question, which contains a numerous Musalman population and extends to within a few miles of Sylhet town, came into their possession.

This piece of country, which is now known as the Jaintiā parganas and forms part of the Sylhet district, is at the present time being re-settled under my supervision, and the opportunity has been taken to piece together the few items of information regarding its ancient history which could be collected.

The materials which have been gathered are, however, very scanty; they consist of (1) traditions, (2) inscriptions on coins, (3) inscriptions on copper-plates (land grants), and (4) references in the *burañjis* of the Āhōms and in the *Vaṁṣāvalī* of Lakṣmī-nārāyaṇa.¹ The information under the first three heads has been obtained chiefly by Babu Giris Candra Dās, Assistant Settlement Officer, who has shown much industry and perseverance in pursuing his enquiries in the directions indicated to him.

Coins.

That the kings of Jaintiā had a mint at an early date is shown by the statement in the *Vaṁṣāvalī* of Lakṣmī-nārāyaṇa to the effect that

¹ See paper on the Koch Kings of Kāmarūpa.—*J. A. S. B.*, 1893, p. 268.

when Nara-nārāyaṇa defeated the Rājā of Jaintiā (a few years prior to 1565 A.D.), one of the conditions which he imposed on the defeated monarch was, that, in future, coins should not be struck in his own name, but that his capital only should be mentioned. This story may perhaps explain why so few Jaintiā coins bear the name of the king in whose reign they were struck, but are simply described as coins “of the most illustrious ruler of Jaintiāpur.”

Although there is thus reason to believe that coins were minted more than 270 years before the annexation of the country, it would seem that their use as a medium of exchange was never very extended. In a report submitted in 1835 A.D., by the Commissioner of Dacca (Mr. Lowis), it is said:

“It is needless to speculate on the fact that the rājā had a tolerably large sum of money in his possession, or that many of the Viṣayadārs have probably considerable hordes; the fact is indisputable that all the more weighty transactions of the community were effected without the help of any thing approaching to the same quantity of silver that circulates elsewhere. The labourer mostly satisfied the demand against him with labour, the producer with produce, and it would be just as reasonable to expect to find a supply of beaver hats or Saxon broadcloth as silver, in places when the general wants of the community have not been such as to demand a supply of these commodities.”

All rents in the time of the rājās were paid in kind, and one of the chief difficulties experienced by the early British administrators of the tract lay in the substitution of money rents for payment in kind.

The Jaintiā rupees were locally known as *kāṭrā ṭākā* from the fact that they bore the device of a sword on them. Unlike the coinage of the Āhōms, which was exceptionally pure, they were made of very debased metal, which was doubtless a result of the system under which the right to mint coins was sold by auction to the highest bidder. Two coins bearing date 1712 Çaka were sent in 1836 A.D. to the Assay Master, Calcutta, for analysis, and were found to contain respectively—

Silver	68 parts	and	Silver	87·5
Copper	123	„	Copper	116·9
Zinc	47	„	Zinc	33·6
Other metals	2	„	Other metals	2
<hr/>				
240				240

According to the Company's standard, the value of the first coin was reported to be 3 annas and that of the second 4 annas 9 pie.

With the exception of a few of more recent date, Jaintiā coins are

now exceedingly rare, and the only collection which I have come across is one found in the possession of an old man living at Jaintiā-puri rāj, the former capital. The following is a list of the coins in this collection with the inscriptions on them :

- (1) *Whole coin of 1591 Çaka.*
obverse. Çr Çr Jayantāpura-purandarasya, Çākē 1591.
reverse. Çr Çr Raghunātha-pāda-padma-parāyaṇasya (Plate XXIV, 8).
- (2) *Whole coin of 1592 Çaka.*
obv. Çr Çr Jayantāpura-purandarasya Çākē 1592.
rev. Çr Çr Çiva-carana-kamala-madhukarasya (Plate XXIV, 9).
- (3) *Whole coin of 1630 Çaka.*
obv. Çr Çr Jayantāpura-purandarasya Çākē 1630.
rev. Çr Çr Çiva-carana-kamala-madhukarasya (Plate XXIV, 10).
- (4) *Whole coin of 1653 Çaka.*
obv. Çr Çr Jayantāpura-purandarasya Çākē 1653.
rev. Çr Çr Çiva-carana-kamala-madhukarasya (Plate XXIV, 11).
- (5) *Quarter coin of 1653 Çaka.*
obv. Çr Çr Rājā Bara Guçāñ.
rev. Siṅha Bāhādurasya 1653 (Plate XXIV, 12).
- (6) *Whole coin of 1696 Çaka.*
obv. Çr Çr Jāyantāpura-purandarasya Çākē 1696.
rev. Çr Çr Çiva-carana-kamala-madhukarasya (Plate XXIV, 13).
- (7) *Whole coin of 1704 Çaka.*
obv. As above, with date 1704 Çākē (Plate XXIV, 14).
rev. As above.
- (8) *Whole coin of 1707 Çaka.*
obv. As above, with date 1707 Çākē (Plate XXIV, 15).
rev. As above.
- (9) *Whole coin of 1712 Çaka.*
obv. As above, with date 1712 Çākē (Plate XXIV, 16).
rev. As above.
- (10) *Quarter coin of 1712 Çaka.*
obv. Çr Çr Rāma-siṅha-nṛpavarasya
rev. Çākē 1712 (Plate XXIV, 17).

These coins have been purchased from the owner and sent to the Society. The interest attaching to them is less than it otherwise would be, owing to the fact already adverted to, that only two of them bear the name of the ruler under whose orders they were struck. These two furnish us with the following dates :—

Bara Guçāñ Siṅha 1653 Çaka
 Rāma-siṅha 1712 Çaka.

I have not included in the above list one coin in the collection (Plate XXIV, 18) because it seems doubtful whether it is a Jaintiā Coin or not. The legend is as follows:

obv. Çr Çr *Jaya-simha-bhūpālasya Çākē* 1585.

rev. Çr Çr *Hara-gaurī-carāṇa-parāyaṇa.*

The character is very similar to that on the coins known to belong to Jaintiā, and the distinctive dagger or sword is engraved on the reverse. On the other hand there is no reference to Jaintiāpur and the legend on the reverse is not found on any of the known Jaintiā coins.

Copper Plates.

Up to the present time, the following copper plates only have been collected:

(1) *Copper Plate, dated 1692 Çaka.*

This plate sets forth that the king, Baṛa Guṇāñ Simha, having become a Sannyāsī, makes a grant of 192 *Kedars* of land to Lila Puri Svāmi, with the consent of his nephews and nieces, including his successor Chattra Simha, and in the presence of his Prime Minister, U. Maupnar Laskar and the Commander-in-Chief Māṇikya Rāy.

(2) *Copper Plate, dated 1710 Çaka.*

This recites a grant by Kāṣā Sati Dēvī, the consort of the above mentioned Baṛa Guṇāñ, of plots of land aggregating 35 *hāls*¹ for the service of the image of the Goddess Kālī in the monastery of Lila Puri Sannyāsī. The grant was made with the concurrence of the princes and of the Rājā Vijaya-nārāyaṇa. On the reverse of this plate are recorded two more grants by the same queen in 1724 and 1725 Çaka, respectively.

(3) *Copper plate, dated 1720 Çaka.*

In this plate is set forth the grant by Rājā Rāma-simha of some land for the temple of Çiva which had been erected by him at Dhupi.

(4) *Copper plate, dated 1727 Çaka.*

This, like No. (2), records a grant by Kāṣā Satī, widow of Baṛa Guṇāñ, the donee being one Nityānanda, the Guru of Rājā Rāma-simha.

¹ In Cachar, the *hāl* is equivalent to 4·815 acres; in Jaintiā it is said to have been somewhat less. A *kedar* or *kiyar* is the twelfth part of a *hāl*. The term *hāl* occurs also in two old copper plates found in Sylhet some years ago and deciphered by the late Dr. Rājendra Lāla Mittra.

(5) *Copper plate, dated 1735 Çaka.*

This is another grant by the same lady, with the consent of Rājā Rāma-simha, of some land for the worship of the idols of Vasudēva, Jagannātha and Bhūdhara.¹

The Jaintiā Kings.

It is known that the Jaintiā Rājās were of Synteng or Khāsī descent, and that although they had long come under the influence of Hinduism, the Khāsī custom of descent through the female continued to the end.² But beyond this we know nothing definite. The old people still preserve a few traditions and profess to know the genealogy of their kings, and all we can hope to do is to test their scanty statements by comparing them with the few scraps of information furnished by the coins and copper plates mentioned above and by stray allusions in the annals of neighbouring states.

The names of the Jaintiā kings with the order in which they are said to have reigned are noted below.

- | | |
|-----------------------|-------------------------------|
| 1. Parbat Rāy. | 13. Pratāpa-simha. |
| 2. Mājha Guçāñ. | 14. Lakṣmī-nārāyaṇa. |
| 3. Buṛha Parbat Rāy. | 15. Rām-simha. |
| 4. Baṛa Guçāñ. | 16. Jaya-nārāyaṇa. |
| 5. Vijaya Mānik. | 17. Baṛa Guçāñ. |
| 6. Pratāpa Rāy. | 18. Chattra-simha. |
| 7. Dhan Mānik. | 19. Vijaya-nārāyaṇa. |
| 8. Jasa Mānik. | 20. Rāma-simha. |
| 9. Sundar Rāy. | 21. Indra-simha. |
| 10. Chōṭa Parbat Rāy. | 22. Rājendra-simha, until the |
| 11. Jasamanta Rāy. | annexation in 1835 A.D. |
| 12. Vāna-simha. | |

Of the first six of these kings, tradition tells us nothing beyond their names, and there is no mention of them elsewhere. As regards Dhan Mānik, the seventh in the list, the Āhōm *burañjis* relate that he was at war with the Kachāris, whose king was named Bhīmāl, and that in order to enlist the Āhōms on his side, he sent to Pratāpa-simha, otherwise known as Çuçenpha, offering him his daughter in marriage,

¹ A curious feature about all these copper plates is that the seal at the top of them is almost identical with the device on the coins of the kings of Tipperah.

² Report of Commissioner of Dacca to the Board of Revenue, dated 13th Novr. 1835. From the first of the copper plates described above it will be seen that the Prime Minister in 1692 Çaka was not Hinduised, as he still bore a Khāsī name and used the distinctive Khasi prefix "U."

on condition that he fetched her *viâ* Sāt-gāō which lay in the Kachāir country. This was in 1535 Çaka (A.D. 1618). The Āhōm king accepted the offer, and the result was a war with the Kachāris. The Āhōm *burañjis* further state that in the course of the reign of the same king (Pratāpa-simha), Maṇala Rājā of Dimuṛia submitted and became tributary to the Āhōms, in order to escape from the oppression of Jasa Mānik of Jaintiā, so that it may be concluded that Jasa Mānik was reigning some time between 1618 and 1639 A.D. (the date of Pratāpa's death), and was probably the successor of Dhan Mānik as stated by the people of Jaintiā. Local tradition has it that Jasa Mānik went to Koch Bihār and married a princess of the Koch family, and that when he returned he brought the image Jaintēçvarī with him.

Of the next five kings on the list, no record has so far been traced, but of Lakṣmī-nārāyaṇa we know that he was living in 1632 Çaka (1710 A.D.), as there is an inscription on the ruined palace at Jaintiā-purī rāj (the old capital) which bears that date, in which it is stated that Lakṣmī-nārāyaṇa was the king who caused the palace to be built.

The next reference is found in the *Āsām burañji* of Kāçināth Tāmuli Phukan, in which it is stated¹ that towards the close of his reign, Rudra-simha, who reigned from 1617 to 1636 Çaka, advanced as far as Mīcā Mukh in Nowgong on his way to invade Jaintiā, when the king Rāma-simha hastened to tender his submission.

The next king Jaya-nārāyaṇa has left no trace behind him, but of his successor, Baṛa Guçāñ, we have a coin dated 1653 Çaka and a copper plate dated 1692 Çaka. From the latter it appears that he abdicated the throne and became an ascetic in the year in which it was inscribed, while it may, perhaps, be assumed that the coin was struck in the year of his accession. If so, his dates will be from 1731 to 1770 A.D.

There is a tradition that this king and his sister Gaurī Kuari were taken prisoners by the Sīm of Khyrim, but escaped by the aid of men sent by Amara-simha, Sīm of Cherrapuñji. It is said that the two villages at which they halted on their return journey to Jaintiāpurī rāj² were given to the Cherra Sīm by Baṛa Guçāñ as a reward for his services on this occasion; these villages are still held *lākhirāj* by his descendants.

The plate referred to above says that Chattra-simha was the successor of Baṛa Guçāñ, so 1692 Çaka may be taken as the date of his accession.

¹ *loc. cit.* p. 35.

² Angajur and Fatehpur.

From the next copper plate, which bears date 1710 Çaka, it appears that Chattra-simha had by that time been succeeded by Vijaya-nārāyaṇa, who in his turn probably died in 1712 Çaka, which is the date found on the coin which bears the name of Rāma-simha. The copper plates show that Rāma-simha was still reigning in 1735 Çaka or 1813 A.D. Indra-simha who succeeded him died shortly before the annexation in 1835 A.D.

From the above it will be seen that the traditional genealogy of the 14th to the 22nd king is confirmed by the inscriptions, &c., which have been collected. The seventh and eighth kings are mentioned in Āhōm chronicles in the order in which they are placed by tradition, and the interval between the date when the eighth king was reigning (*cis* 1638 A.D.) and that of Lakṣmī-nārāyaṇa's inscription on the palace at Jaintiāpurī rāj (1710 A.D.) is about what would suffice for the reigns of the five intervening princes of whom no record has hitherto been found. There is therefore, fair reason for accepting the traditional genealogy as correct, so far at least, as the seventh and subsequent kings are concerned.

The story of the annexation of Jaintiā is told at sufficient length in Mackenzie's North-Eastern Frontier. It will suffice to mention here that it was due to the abduction of four British subjects as human sacrifices to Kālī.¹

¹ This custom of offering human sacrifices was common amongst the Āhōms, Koches and Kachārīs, and will form the subject of a separate note later on.

Ancient Cēdi, Matsya, and Karūṣa.—By F. E. PARGITER, B.A., I.C.S.

(With a Map, Pl. XXV).

[Read August 1895.]

The ancient country of Cēdi is one of which little information is given in Sanskrit writings in comparison with the important part which its kings played in early history.

General Sir A. Cunningham in his *Archæological Survey of India* places Cēdi on the R. Narmadā (Nerbudda) and in Chattīsgarh. He says, 'Tewar or Tripura was the capital of the Kulachuri Rājās of Chedi. In the Haima Koṣa Tripura is also called Chedinagari. Amongst the Brahmans it is famous as the site of the defeat of the demon Tripura by Siva. There can be no doubt, therefore, that the place is of great antiquity; although it is probable that it was not the most ancient capital of the celebrated Chedi-des. At a very early period the whole of the country lying along the upper course of the Narbada would appear to have been occupied by the Haihaya branch of the Yādavas. In the Mahā-bhārata several different persons are mentioned as kings of Chedi; but as nothing is said about their relationship, they most probably belonged to different divisions of the country. It would seem therefore that, some time before the composition of the Mahābhārata, the land of Chedi had already been divided into two or more independent states, of which one belonged to Rājā Sisu-pāla, whose capital is not mentioned; and another to the father of Chitrāngadā, whose capital was Manipura. The capital of Chedi in the time of Rājā Vasu is said to have been situated on the Suktimati River, which according to the Purānas has its rise in the Riksha range of hills along with the Tons and the Narbada. In later times we know that there were two great Haihaya States in Central India, viz., the kingdom of Mahā Kosala with Manipur for its capital, and the kingdom of Chedi proper with Tripura for its capital. But as the Haihayas of Kosala date their inscriptions in the Chedi or Kulachuri Samvat by name, we have an additional proof that their country was

once included within the limits of the ancient Chedi. I incline therefore to look upon Manipur (to the north of Ratanpur) as the original capital of Chedi-des and to identify the Suktimati river with the Sakri which rises in the hills of the Kāwarda State to the west of Lāphā.' (Rep. Arch. Surv. IX. pp. 54 and 55). And the title Kulachuri or Kalachuri 'would seem to have been confined to the Tripuri branch of the Haihayas and its ramifications; while the Manipur kings, after the transfer of their capital to Ratanpur, were known as the Ratnavali Haihayas.' (*Ibid.*, p. 57). And again, 'as we learn from the Mahābhārata that the capital of Chedi was situated on the Suktimati river; and as we know that the Mahanadī flowed through the country of Chedi, I am more inclined to accept the Mahanadi as the representative of the Suktimati, and to place the capital of Kosala [Chedi?] on its banks.' (*Id.*, XVII. p. 24).

The notices of Cēdi, however, which are found here and there in the Mahā-bhārata and elsewhere shew very plainly that, whatever may have been the movements of the Cēdi princes in after years, the country of Cēdi in the Pāṇḍavas' time was very far north of the Narmadā and Mahānadī.

Cēdi was closely associated with Matsya. King Vasu, who established a dynasty in Cēdi, had a son called Matsya who became a king (M.-bh., Ādi-p., lxiii. 2371-93; and Hari-varṇa, xxxii. 1804-6), and though it is not stated where Matsya reigned, yet it seems reasonable to suppose he reigned in Matsya. But putting that aside, it is stated positively that an ancient king Sahaja reigned over both the Cēdis and the Matsyas (Udyōga-p., lxxiii. 2732). Matsya as will be seen was the country south-west of Indra-prastha or Delhi, and it would have been impossible for one king to rule over that district and a kingdom on the Narmadā, whether the intervening region was peopled or covered with forest. This passage demonstrates that Cēdi must have touched Matsya.

Further the Cēdis are often joined with certain other people, as if forming a natural group; thus they are linked in one compound with the Matsyas and Karūṣas (*e.g.*, Bhīṣma-p., ix. 348; liv. 2242; and Karṇa-p., xxx. 1231), and with the Kāçis and Karūṣas (*e.g.*, Ādi-p., cxxiii. 4796; and Bhīṣma-p., cxvii. 5446). Kāçi was of course Benares; and the position of Matsya and Karūṣa may be determined here, because Lassen has placed them erroneously in his map (Ind. Alt.), Matsya north of Allahabad and Benares, and Karūṣa in the north of Oudh.

Brahmāvarta was the country between the rivers Saras-vatī on the north and Drṣad-vatī on the south and east (Manu II. 17). South and east of it lay Brahmarṣi-dēça, which comprised Kuru-kṣētra,

Matsya, Pāñcāla and Çūrasēna (*ibid.*, 19). Now Kuru-kṣētra, it is well-known, was the land south of the Dṛṣad-vatī; Pāñcāla comprised the middle portion of the Ganges and Jumna Doab; and Çūrasēna was the country around Mathurā, the modern Muttra. Matsya as part of Brahmarṣi-dēça touched Kuru-kṣētra on the south and Çūrasēna on the west. This will appear from the following references.

Matsya lay southward from Khāṇḍava-prastha or Indra-prastha, for the first two countries which Saha-dēva conquered in his Expedition to the Southern region were Çūrasēna and Matsya (Sabhā-p., xxx. 1105-6). Its position to the west of Çūrasēna is also brought out clearly by the description of the Pāṇḍavas' journey to the court of Virāṭa king of Matsya, when they had resolved on spending their last year of exile in concealment there; for crossing the Kālindī or Yamunā in the south portion of the Doab, they travelled north-westward, passing north of the Daçārṇas and south of the Pāñcālas and then through the Yakṛllōmas and Çūrasēnas into Matsya (Virāṭa-p., v. 141-5).

These indications entirely bear out Cunningham's statement that Matsya was the country west of Agra and north of the R. Chambal (Rep. Arch. Surv. II. p. 242; and XX. p. 2 and Plate I); though it would perhaps be a little more precise to say Matsya comprised the modern State of Alwar with the country around it, and stretched southward as far as the R. Chambal, for it touched Cēdi there. South of Matsya were certain people called Aparā-Matsyas (Sabhā-p., xxx. 1108), and they very probably occupied the hilly tract on the north bank of that river, that is, they were the inhabitants of the southern portion of Matsya.

Such being the position of Matsya, it appears plain how there could have been frequent raids between Matsya and Trigarta which lay on the north of Brahmāvarta (Virāṭa-p., xxx); and how the Pāṇḍavas, when wandering about in the forests after they had been burnt out of Vāraṇāvata (Ādi-p., cxlviii.), visited the Matsyas, Trigartas, Pāñcālas and Kīcakas, which were the nations that surrounded the Kurus (*id.*, clvi. 6084-7); and again how, when Çalya king of Madra (the capital of which, Çākala, was in the Rechna Doab between the rivers Chenab and Ravi—Sabhā-p., xxxi. 1196-7; and Cunningham's Arch. Surv. Repts., II. pp. 192-6) was marching to see the Pāṇḍavas in Matsya at the beginning of the great war, Duryōdhana had time to hear the news at Hāstina-pura and get an interview with him on the way, (Udyōga-p., vii).

The mention of the Matsyas in the description of Bhīma's conquests in the East region (Sabhā-p., xxix. 1081-2) is no doubt a mistake; whether it is a mistake for Vatsa, which was the country at

the south end of the Ganges and Jumna Doab with its capital at Kau-
çāmbī, the modern Kōsam (Arch. Surv. Repts., I. pp. 301–310), is
not clear, for Vatsa is definitely mentioned in *ibid.*, 1084. So also the
double mention of the Matsyas in the list of Indian peoples in the
Bhīṣma-p. (ix. 347 and 348) appears to be a mistake, and here there
can be little doubt that the name in the first of these verses should be
Vatsa (or Vātsya, as the people were also called), for otherwise the
Vatsas are not mentioned in the list at all.

The capital of Matsya was *Upa-plavya* or *Upa-plava* (Çalya-p.,
xxxvi. 1973–6). From there to Hāstina-pura was less than two days’
journey by chariot, for Kṛṣṇa in going from there to see Dhṛta-rāṣṭra,
started one day, reached a village Vṛka-sthala at evening, and went
on to Hāstina-pura next day (Udyōga-p., lxxxiii. 3010–17; lxxxv.
3040; and lxxxviii. 3101).

Now there are a few indications given in the Rāmāyaṇa regarding
the speed at which people could travel by chariot in ancient times.
Thus, the messengers who were despatched from Ayōdhyā express to
the Kēkaya capital Giri-vraja in the Panjab, to inform Bharata of his
father Daça-ratha’s death, accomplished the journey in just seven days
(Ayōdh.-k., lxx. 2–19); and Bharata in hastening back by a different
route spent seven nights on the way so that he completed the distance
within eight days (*Id.*, lxxiii. 2–17). Cunningham has identified Giri-
vraja with the modern Jalalpur on the Jhelam (Arch. Surv. Repts.,
II. pp. 14, 173–177), but it is not essential to the present purpose
whether this identification is perfectly correct or not, for it is quite
certain that the Kaikēya or Kēkaya country and Giri-vraja occupied
more or less nearly the position which he has assigned them. The
distance from there to Ayodhyā is about 650 miles in a direct line,
and may be taken to have been about 700 by road. The messengers
then travelled at about 100 miles per day, and Bharata at about 90.
Again, when Janaka king of Vidēha, sent messengers to Ayōdhyā to invite
Daça-ratha to Mithilā, they travelled in carriages driven fast and
reached Ayōdhyā on the fourth day (Ādi-k., lxx. 1). This distance
is about 200 miles, and the day’s journey would have been about 50 or
60 miles: this slower rate may be explained by the very reasonable
supposition that the roads to the east were not so good as those through
Madhya-dēça.

Upa-plavya therefore was probably not more than about 150 miles
from Hāstina-pura, and this distance would make Upa-plavya fall some-
where in the neighbourhood of Alwar or Bairāt. Cunningham says
Bairāt represents the ancient capital Vairāṭa, but I have met no passage
in the Mahā-bhārata which calls Upa-plavya by that name, and it does

not appear to be certain that the two names mean one and the same city; though it is of course very possible that the name derived from king Virāṭa may have superseded the older name. Lassen places Upaplavya on the site of the modern Amballa (Ind. Alt., Map).

We may now return to Cēdi. King Vasu, while out hunting one day, sent (it is fabled) a message home to his queen by a hawk, and the bird flew over the Jumna on its way to her (*Ādi-p.*, lxiii. 2373-87). Hence it appears Cēdi must have bordered on that river; the king could hardly go hunting in forest territory far from his realm; and it may even be inferred perhaps that the business entrusted to the bird implies that the king could not have been at a great distance from his capital. This fable, absurd as it is, yet must have a real and true ingredient of topography in it, for Satya-vatī dwelt on the banks of the Jumna and gave birth to Vyāsa on an island in that river (*Ibid.*, 2396-2426), and the story which explains the lineage and honour of queen Satya-vatī and the great Sage in a miraculous manner, yet harmoniously with ancient ideas, would not have given satisfaction unless it agreed with the well-known conditions of the country.

Cēdi is said to be one of the countries around the Kurus when the Pāṇḍavas debated where they should spend the last year of their exile (*Virāṭa-p.*, i. 11-12); and Yudhiṣṭhira names the Cēdis with the Kāçis, Pāñcālas, and Matsyas as the nearest nations with whose friendly intervention he chose five villages for his kingdom of Indra-prastha (*Udyōga-p.*, lxxi. 2594-5). And, as has been mentioned already, Cēdi touched Matsya. It is said to be in the eastern region when Bhīma went forth on his expedition to conquer the east (*Sabhā-p.*, xxviii. 1069-74); but it was in the southern portion of that region, for it is connected with the Daçārṇas (who dwelt on the modern river Dasān in Bundēlkhaṇḍ) and with the Pulindas (who appear to have dwelt south of the Daçārṇas)

All these conditions can only be satisfied by placing Cēdi along the south bank of the Jumna from the R. Chambal on the north-west about as far as Karwi (which is north-east of Citra-kūṭa) on the south-east; and its limits southward would have been the plateau of Malwa and the hills of Bundēlkhaṇḍ. Cēdi is placed in the south in the story of Arjuna's following the sacrificial horse over India (*Āçva-mēdh.-p.*, lxxxiii. 2466-9), and the position now proposed will satisfy this passage also. The Yakṛllōmas, who have been mentioned above in connexion with Matsya, were probably a tribe dwelling along the north of the Cēdi territory, for, beyond that they are named in *Bhīṣma-p.*, ix. 353, they are hardly to be found alluded to elsewhere.

The capital of Cēdi is said in the *Mahā-bhārata* to be Çukti-matī.

(Vana-p., xxii. 898), or as it was also called by way of variety Çukti-sāhvayā (Āçva-mēdh.-p., lxxxiii. 2466-7). It was situated on the R. Çukti-matī, for it is said the river flowed towards the city, and a legend was told that Mount Kōlāhala, being in love with the river, obstructed her, but king Vasu gave the mountain a kick and the river flowed out through the passage made by the blow (Ādi-p., lxiii. 2367-70). Cunningham's identification of the river and city has been quoted above, and Mr. Beglar has proposed another solution (Arch. Surv. Repts., VIII. pp. 123-125), but they do not agree with the position now found for Cēdi, nor with the further data which I now proceed to discuss.

The Çukti-matī river is said in the Purāṇas to rise in the Vindhya range, and not in the Rkṣa range as Cunningham says. There is some confusion between the two ranges in the Purāṇas, largely through errors of transmission, and partly also because the two ranges form a kind of knot at Amara-kaṇṭaka, where the Narmadā, Sone and Mahānadī in its Seonath branch (which was formerly considered the main stream) rise, and these rivers were held to rise in the Vindhya Mountains; but looking at the other rivers assigned to these two watersheds, the Çukti-matī is grouped with the Daçārnā (Dasan), Citra-kūṭā (near Mount Citra-kūṭa), Vipāçā (Bias, a tributary of the Ken), Tamasā (Tons) and Viçālā (at Gaya), all of which unquestionably rise in the long Vindhya chain; and not with the Tāpī (upper part of the Tapti), Payōṣṇī (Purna and lower part of the Tapti), Vēṇā or Vēṇyā (Wain-ganga) and Vaitaraṇī (Bytarni) which unquestionably rise in the Rkṣa range. The actual grouping decides this matter, and not the mere text of the Purāṇas which may be and is full of mistakes; thus the Matsya Purāṇa (cxiii. 25-28) and the Kūrma (xlvii. 30-33) wrongly interchange the names of the two ranges, making the former group of rivers rise in the Rkṣa Mountains and the latter in the Vindhya; while the Mārkaṇḍeya Purāṇa (lvii. 21-25) makes the same mistake as to the second group and declares the first group rise in the Skandha range, when there are no such Mountains! These errors and the not infrequent jumble of names are no doubt due to the ignorance of transcribers; for it is a remarkable fact that the early Sanskrit writers had a much better knowledge of the Geography of India than their successors; the Rāmāyaṇa and Mahā-bhārata contain a considerable quantity of fairly accurate information, while the Raghu-vaṃṣa, Çiçupāla-badha and modern poems are singularly barren in this respect.

The R. Çukti-matī then rises in the Vindhya Mts.; and it must be noted that in the Purāṇa lists this name includes the hills about as far west only as Saugor where the Daçārnā rises, for the next im-

portant river westward the Vētra-vatī (Betwa) is assigned to the Pāripātra watershed. Presumably then the Çukti-matī must be east of the Daçārnā, and the only noteworthy river in that direction which breaks through the hills is the Ken. I have not been able to discover any Sanskrit name for the Ken. Lassen gives its ancient name as Kāyana (Ind. Alt., Map), and Cunningham says Ken or Kayān is a corruption of Karṇa-vatī (Arch. Surv. Repts., II. p. 446, and XXI. p. 156); but I have not met with either of these names anywhere else, nor are they mentioned in Prof. Sir M. Monier-Williams' Dictionary. Now the Ken is too large and important a river to have escaped being noticed and named, especially when its western-most tributary was called the Vipāçā (Bias). Putting these facts together then, it seems to me the Ken must be the Çukti-matī. It breaks through the hills between Panna and Bijawar in a way that suits the legend, and it flows through the country, which on quite different reasoning has been identified as Cēdi. The results of these two entirely independent lines of argument certainly corroborate each other, and the reasons for accepting this identification, to which I have been led solely in the course of working out the foregoing data, appear to be very strong.

Mount Kōlāhala then would be the hills between Panna and Bijawar; it is not a single hill, for that would hardly suit the legend, and moreover the Sanskrit words *parvata*, *giri*, &c., often denote a cluster or group or chain of hills, while *çikhara*, *gr̥gga*, &c., are more properly the terms for a single hill or peak.

The capital Çukti-matī then must have been situated on the Ken after it breaks through the hills, but its exact site can only be discovered by careful local inquiry and the aid of large maps. It may, however, be placed provisionally in the neighbourhood of Banda, for that would be about the most suitable position for a capital with regard to the configuration of the country.

We may next consider the position of Karūṣa. The word is also written Kāruṣa, Kārūṣa, and Kāruṣaka. The Karūṣas constituted a powerful nation under king Danta-vakra in the Pāṇḍavas' time (Sabhā-p., xiii. 575-7; and Hari-v., xci. 4963), and the royal line was a famous one (Ādi-p., lxvii. 2700); yet they seem to have consisted of several tribes, for Karūṣa "kings" are spoken of (Udyōga-p., iii. 81). The Karūṣas were not looked upon as closely allied to the nations around them, for their origin is carried in the Hari-vamṣa directly back to an eponymous ancestor Karūṣa, a son of Manu Vaivasvata (x. 614; and xi. 658).

The position of Karūṣa is indicated by the following allusions. It is linked with Cēdi and Matsya as already mentioned: with Kāçi

(Bhīṣma-p., lvi. 2415); with Cēdi and Kāçi as already mentioned; and with the Vātsyas or Vatsas (Droṇa-p., xi. 396) whose position has been stated above. Moreover king Danta-vakra acknowledged Jarāsandha king of Magadha (*i.e.*, the modern districts of Gayā and Patna) as his suzerain (Sabhā-p., xiii. 575-7; and Hari-v., xci. 4963). Viçvā-mitra, when taking the youthful Rāma to slay the Yakṣiṇī Tāḍakā, crossed from the R. Sarayū to the south of the Ganges and entered the modern district of Shāhābād; and said that that region had once been inhabited by the Malajas and Karūṣas (Rāmāy., Ādi-k., xxvii. 8-23). Lastly Karūṣa is described in the Mahā-bhārata as a country not very accessible (Sabhā-p., li. 1864): and the Mārkaṇḍēya Purāṇa says distinctly that Karūṣa is one of the countries touching the Vindhya Mts. which stretch from Malwa into Bihar (lvii. 52-53), and so also the Matsya Purāṇa (cxiii. 51-52).

Karūṣa therefore was a hilly country and lay south of Kāçi and Vatsa, between Cēdi on the west and Magadha on the east, and enclosing the Kaimur hills which are part of the Vindhyas; that is it comprised all the hilly country of which Rewa is the centre, from about the river Ken on the west to the confines of Bihar on the east. It would have touched Cēdi on its north-west and Daçārṇa on its west.

The passage cited from the Rāmāyaṇa suggests that the Karūṣas originally inhabited the Shahabad district and the region of the lower Sone, and had been driven out shortly before Rāma's time southward and south-westward into the hilly country which is shewn to have been their territory in the Pāṇḍavas' time and afterwards; but as all the country was dense forest about Prayāga and Citra-kūṭa in Rāma's time (J. R. A. S., 1894, pp. 238-241), it may also be inferred that the Karūṣas had not then acquired all that territory, but were spreading westwards over it gradually.

We may next notice the information which is to be gleaned regarding the dynasty which reigned over Cēdi. It began with Vasu, who was surnamed Upari-cara, and who took possession of the country at Indra's command (Ādi-p., lxiii. 2334-5). From the description given of it, it appears to have been a flourishing land already; so that Vasu did not carve out a new realm, but must have invaded an attractive country and possessed himself of the sovereignty of it, in commemoration whereof he established a festival in Indra's honour (*ibid.*, 2340-5 and 2361). He was not a Haihaya, but a Paurava as the first of these passages shews, though no further allusion is made to his parentage. There is some divergence as to the period when he lived. As father of Satya-vatī he would have been contemporary with Bhīṣma's father Çāntanu or grand-father Pratīpa; yet the Hari-varṇa also

throws him five generations back by making her the fourth ancestress of Brahma-datta, king of Kāmpilya, who was Pratīpa's contemporary (xviii. 967-81; and xx. 1047); and again places him midway between these two periods by the genealogy which it gives of his descendants (xxxii. 1804-10).

The kingdom which Vasu founded was a powerful one. He annexed the neighbouring territories, chiefly to the east, and placed his five sons who were called the Vāsava kings there. They established separate dynasties, of which only two however are clearly mentioned, *viz.*, Vṛhad-ratha ruled over Magadha, with Aṅga seemingly as an appanage, and Kuṣa (or Kuṣamba) Maṇi-vāhana reigned presumably in Kauṣāmba (Ādi-p., lxiii. 2362-5; and Hari-v., cxvii. 6598). Which son succeeded him in Cēdi is not stated, nor where the two other sons reigned; but it is highly probable that Karūṣa was the territory ruled by one of them, for its position midway between Cēdi and Magadha would have necessitated its conquest before Magadha, and the strong friendship between the kings of the three countries (Sabhā-p., xiii. 571-5; and xlvii. 1570) and the alliances by marriage (Hari-v., xxxv. 1927, and 1930-2) indicate a close connexion between these dynasties. I may note here that the king Vasu mentioned in Rāmāyaṇa, Ādi-k., xxxv. 1-9, appears to be quite a different monarch, and prior in time to Vasu Upari-cara.

The next king of Cēdi mentioned after Vasu was Dama-ghōṣa, who was probably fourth or fifth in descent from him. He married Kṛṣṇa's aunt, and his son was Çiṣu-pāla, the famous king of Cēdi, whom Kṛṣṇa slew (Hari-v., xxxv. 1927-31; xcv. 5256; and cxvii. 6599-6600). Çiṣu-pāla was also called Su-nītha (Hari-v., cviii. 6029; cxvii. 6594-6608). Çiṣu-pāla's son and successor was Dhṛṣṭa-kētu (Udyoga-p., clxx. 5900) who joined the Pāṇḍavas in the great war and was killed there. He was succeeded in the throne by his younger brother Çarabha (Āçva-mēdh.-p., lxxxiii. 2468-9), and with him the curtain falls on the stories of those stirring old times.

I do not find any indications, as Cunningham alleges, that several different persons are mentioned as being kings of Cēdi at the same time. Allusions are made to other kings of Cēdi besides those whom I have just noticed, but they refer to earlier monarchs who belonged to times prior to Vasu Upari-cara. For instance, the king of Daçārṇa had two daughters, one of whom married Vīra-bāhu king of Cēdi, and the other Bhīma king of Vidarbha; and the latter's daughter was Dama-yantī who married king Nala (Vana-p., lxix. 2707-8). Vīra-bāhu appears to be the same king who is called Su-bāhu Satya-darçin (*id.*, lxv. 2576). Nala's story however belongs to times long prior to the Pāṇḍavas: this is plain from the way in which the story is told, his down-

fall being a well-known example (see *id.*, xiii. 601); and he is made a contemporary of Rtu-parṇa or Rta-parṇa king of Ayōdhyā, who is placed about 34 generations above the Pāṇḍavas' time in the genealogy in the Hari-varṇa (xv. 814-30); and Damayantī's father Bhīma is placed about 25 generations prior to that era in the same book (xxxvii. 1989-xxxviii). This allusion to Cēdi bears out the remarks made in the third previous paragraph that Cēdi was a flourishing land before Vasu's time, and that he must have entered it by conquest. I am not aware of any passage in the Mahā-bhārata which connects Maṇi-pūra and king Citra-vāhana father of Citrāṅgadā with Cēdi or Chattisgarh; rather, it is strongly suggested that Maṇi-pūra was on the eastern sea-coast south of Kalinga (Ādi-p., ccxv. 7823-4).

NOTE.—Since writing the above I have found some genealogical information regarding the Cēdi kings in the Matsya Purāṇa. Cēdi is derived from an eponymous king Cidi, grandson of Vidarbha, who it is said founded the kingdom of Vidarbha, and great grandson of Jyāmagha who conquered and reigned over the country along the Narmadā and the Rkṣa Mts. (xliv. 28-38). These kings were descended from Krōṣṭu, son of Yadu, while the Haihayas were the descendants of Haihaya, grandson of Yadu's son Sahasra-ji (xliii. 4-7; and xlv. 14).

The 50th canto contains the genealogy of Vasu Upari-cara. He is said to be fourth in descent from king Kuru, son of Saṁvaraṇa, of the Paurava race (20-26), and is placed 14 reigns anterior to the Pāṇḍavas (20-23, and 34-50) and is made the ninth ancestor of their contemporary Jarāsandha (26-32).

These statements indicate that the kingdom of Cēdi was founded as an offshoot from the south by the Yādavas of Vidarbha; and after it had lasted through some 20 or 25 reigns, Vasu Upari-cara, the Paurava-kaurava, from the north invaded and conquered the country and established his own dynasty in it.



Description of Lhāsa Cathedral, translated from the Tibetan — By

L. A. WADDELL, LL.D.

(With Plate XXVI).

[Read August 1895].

No detailed description of the great temple or cathedral of Lhāsa, the jealously guarded St. Peter's of Lāmādom, seems to be on record. The only extant accounts of it appear to be the rather brief notices in Giorgi's *Alphabetum Tibetanum*,¹ in the Chinese histories, which have been translated by Klaproth² and Rockhill,³ in the Abbé Huc's narrative, and the few general references to it scattered through the reports of the Indian Survey spies.

The descriptive account now given, is found in the official guide-book to the cathedral, a booklet of forty-six pages printed at Lhāsa and entitled 'The Crystal Mirrored Catalogue of the transformed Lhā-ldan (Lhāsa.)'⁴ This book is a recension of a much larger one in three sections, which respectively describe the three great temples of Lhāsa, Sam-yas and Ra-mo-ch'e.

As, however, its author is the crafty prelate, the 1st *Dalai* Lāma (A.D. 1615–1680) who took such liberties with Tibetan tradition,⁵ twisting it to suit his schemes and mixing with it so much of the lying

¹ p. 406 *et seq.*; Rome, 1762. He gives a ground-plan of the chief building.

² Notice sur H'Lassa capitale du Tibet, in the *Nouv. Annales des Voyages* IIe series t. XIV. p. 257–275.

³ *Tibet, a geographical, ethnological and historical sketch derived from Chinese sources.* J.R.A.S. 1891. pp. 8, 70–76, 263 *et seq.*

⁴ The title is given in bilingual form, in corrupt Sanskrit and modern Tibetan thus:—

དེ་བཙུན་ཀྱི་མ་ཐུ་བེ་མྱ་ར་ཤ་རྩ་བུ་ཐུ་མེ་ལྷོ་ལྷོ་ར་ད་རྒྱ་བེ་ཅ་ར་དེ་མེ།

Devamānīrmasya vihāra varṇadyasbāṭekai shuklebhira darsha viharatisma.

ལྷ་ལྷན་སྤྱུ་པ་འི་གཙུག་ལག་ཁང་གི་དཀར་ཆས་ཤེས་དཀར་མེ་ལོང་བཟུགས་།

Lha-ldan sprul-pa'i gtsug-lag-k'aṅ gi dkar-ch'ag s'el-dkar me-long-bzugs.

⁵ See my *Buddhism of Tibet*, 39, &c.

gabble of the priests, this record therefore cannot be considered to be true history in respect to the earlier periods. Thus his frequent statements that such and such an image 'was made or existed in the time of King Sron-tsan Gam-po (7th century A.D.)' must always be taken for what they are worth. As, however, the book is the official guide to the buildings and their contents, it may be considered fairly authentic and trustworthy in regard to the events which are alleged to have happened since say, about the 15th century A.D.

It contains interesting accounts of the chief images, frescoes and other works of art¹ in this celebrated, though little known fane; which is deemed the centre of Tibet: to which all roads run, and from which all distances are calculated. Our account also mentions the principal benefactors of the building, some of whom are of historic interest. And, while it shows what a thorough paced idolatry Lāmaism really is, it also shows how remarkably catholic is the form of Lāmaism represented in this metropolitan temple. For although it is in the hands of the Gelug-pa, the now dominant sect, which retains the temporal government in its hands, and which openly despises and almost persecutes the other less fortunate sects; still this temple contains the images and deities of every one of the many sects of Lāmaism, and it gives a very prominent place to images of Padma-sambhava, who I believe, was the founder of Lāmaism,² but whom the Gelug-pas now endeavour to ignore altogether. Such unorthodox images appear to have been already in possession of the temple upon the accession of the Gelug-pas to supreme power in the 17th century; but the latter seem to have endeavoured to swamp them as far as possible, by numerous later additions, restricted to saints and canonized monks of their own particular sect.

Though the present account describes the condition of the temple shortly after the building had passed into the hands of the Gelug-pas, it is still fairly well descriptive of its present-day state, as almost all the images retain their original positions, and the additions have been almost exclusively those of Gelug-pa saints and the special tutelaries of that sect. Such additions I intend to indicate briefly in a supplementary article, hereafter.

The general appearance of the cathedral of Lhāsa has been described by me elsewhere³ from the existing literature on the subject,

¹ There is also (says the Chinese account translated by Rockhill *loc. cit.*, p. 283) "a collection of antique arms, two-edged swords five or six *ch'ih* long, fowling pieces from eight or nine *ch'ih* to a *ch'ang* long resembling the chin-tzii cannon of the present day, great bows and long arrows. They are all strange-looking objects."

² *Buddh. of Tibet*, pp. 24-33, 378-382, 519, 531, &c.

³ *Buddh. of Tibet*, pp. 300 *et seq.*

with the exception of Mr. Rockhill's notes¹ which I am sorry to say had escaped my notice. The attached illustration from a native drawing gives some idea of its appearance.² The chapels and other buildings³ which compose the temple do not appear to form a pile of grand architectural proportions, but rather a cluster of squat buildings, resplendent in green and gold with glittering gilded roofs.⁴ They cover a very large area of ground, about a quarter of a square mile it is said, and the surrounding circular road is at all times daily circumambulated by hundreds of pilgrims and residents, many of whom do this devotional duty in penitential fashion, by measuring their lengths on the ground, as shown in the attached picture.

The frescoes and images seem to be more of mythological than artistic interest, and the decorations appear to be almost barbaric in their splendour, with their wealth of gold and precious stones and rich silk embroidery and brocades, the votive offerings which have been lavished on this central shrine by pious kings and other devotees for over twelve centuries.

The most intrinsically precious images, those made of solid gold, of which there are many hundreds, and those containing the most precious stones, are safeguarded in a strong chapel the doors and windows of which are protected by heavy iron gratings ('Chag-ṭa'⁵) through which the ordinary pilgrims and visitors can only peer, except on a certain annual festival, when the building is thrown open to the public.

The name Lha-sa⁶ or 'the place of the gods,' is the vulgar name for the temple, and is properly restricted to denote the temple itself, and not the city so-called. The original book-name of the temple seems to have been Ra-sa,⁷ or 'the enclosed or fenced spot,' which name is

¹ *loc. cit.*, containing important precise information, culled by Mr. Rockhill, from trustworthy Chinese sources.

² It may be compared with that illustration from Chinese sources given by Mr. Rockhill, in his article referred to (p. 70). Several Lāmas and others to whom I have shown both illustrations state that my picture gives the better representation of the building

³ Part of it is also used as a state-treasury. Mr. Rockhill writing from Chinese sources of information says, 'the annual revenue in money amounting to probably 127,000 ounces of silver, all the produce and monies received as taxes are stored away in the treasury in the Jo-k'ang (the Lhāsa Cathedral) and are under the care of three Sha-dso-pa (*i.e.*, Treasurers). *loc. cit.*, p. 8.

⁴ The Chinese account translated by Rockhill (*loc. cit.*, p. 263), says "around the central court-yard there have been erected brick pavilions several stories high and pillared halls, the tiled roofs of which are ornamented with gold."

⁵ རྩ་ཏ་ཤེས་པ་ | lC'ags-k'ra.

⁶ ལྷ་ས་ |

⁷ ར་ས་ |

still preserved in the official designation of the cathedral;¹ but the ordinary book-name is 'Lha-ldan,'² or 'the godly possession;' and this is the name by which it is referred to throughout this booklet.

This book begins with an invocation in corrupt Sanskrit, in *Kuṭila* characters, followed by a Tibetan translation, both of which I have omitted. The text is written in very difficult Tibetan verse, of which each set of eight stanzas is followed by a paraphrase in ordinary prose. It is this latter version which is here translated.

In transliterating Tibetan words into Roman characters, I have followed Jäschke's modification of Csoma's method as closely as the use of ordinary diacritical marks permits. The silent consonants are placed in italics as in Csoma's plan. And the names of deities and other personages and things which I have translated into their more familiar Sanskrit equivalents, have been printed in italics.

"The great loving son of *Çuddhōdana*³ (i.e., Prince *Çākya Simha*) the commiserating Lord, in order to lead all the countless living beings, without distinction, to the glorious path of happiness, has founded the precious Doctrine for the benefit of the gods and the whole host of living beings. The high ranked⁴ *Maitrēya*, the religious protector who causes the doctrine to prosper freely, desiring to place it in charge of a king, devised plans for introducing the Teacher's Doctrine into the kingdom of snowy Bod (Tibet).

"(Thus) the sublime triad of Lords,⁵ subdued the rude people of this barren country (of Tibet), and turned their attention to the *Jina's* religion, so as to cause it to prosper abundantly. During the reigns of the kings between the noble of *gÑa-K'r'i-btsan-po* down to *Lha-t'o-t'o-ri*, namely *gNam-gyi-k'ri-bdun*, *sTod-kyi-sten-gñis*, *Bar-du-legs-drugs* and *'Og-gi-btsan-gsum*, there was scarcely any religious administration of justice at all. *Lha-t'o-t'o-ri-gñan-btsan* founded the beginnings of religion, and after five generations the great religious

¹ ར་ས་ཤུག་སྒྲུང་། Ra-sa 'p'rul-snaṅ.

² ལྷ་ལྷན་།

³ ཇེ་བུ་མཆོད་སྒྲུང་། Zas-gtsaṅ-sras.

⁴ ས་ཆེན་པོ། Sa-ch'en-po. This term is also used to denote a high stage, the eighth, of the 10 grades of Bodhisats (*Daśa-bhūmi*) JAESCHKE'S *Tibetan Dict.*, p. 569.

⁵ རྟལ་ལྷ་པོ་པ་འཇམ་དཔལ་མཆོད་པོ་། 'Pags-pa rigs-gsum mgon-po. These are the three metaphysical Bodhisats who are adopted as the *defensores fidei* of Lāmaism, namely, Mañjuçrī, Vajrapāṇi and Avalōkita.

king, the incarnation of *Padmapāṇi*¹ Sroṅ-btsan-sgam-po, obtained the lotus-throne.

“His (Sroṅ-btsan-sgam-po’s) fame as an ardent devotee of Buddha spread far and wide throughout the world.² On this account the great kings of China, India and Persia and also ‘Ge-sar’ (= ? the Kaisar or Czar)³ paid him humble reverence and tribute. He sent to India his pious minister *mT’on-mi-sam-bho-ta*, who there studied the Sanskrit language and framed the necessary thirty-four ‘Tibetan’ characters upon the model of the Indian ones. The laws were based upon ‘the ten precepts’ and they were rigorously enforced on all the subjects, high and low, like a heavy golden yoke hung upon the neck. The monk *Vikrama-sambhava-mati* (?)⁴ was sent (to India) to invite the two kinds of self-sprung⁵ tutelary-gods.

“By means of magical insight⁶ and the mystical powers of esoteric and exoteric *mantras*, and the wise acts of his minister *mGar*, he (the king Sroṅ-btsan-gam-po) humbled the proud kings of China and Nepal (and forced them to give him their daughters in marriage). His two consorts, who were incarnations of *Tārā* and *Bhṛkuṭi* brought as their respective dowries, the image of the omniscient one of the *Ikṣvāku*⁷ and other wonderful images which imparted great blessings, also rich presents of wealth which exceeded the whole treasury of the lord of the *Nāgas*.

“During that period the mighty kingdom of Tibet overflowed with religion and riches like a river in summer flood. Within its glacial walls, the following hills (surrounding Lhāsa) appear like the eight spokes of the heavenly-wheel,⁸ and the eight petals of an earthly

¹ He is here given the title of ཡུ་ཇ་ཀ་པ་དེ་ཡི་ཡེ་ཤེས་ཀྱི་ཐུ་བྲུག་འདུ་བའི་རྒྱལ་པོ།
ཡུ་ཇ་མཁའ་ཚོས་ས་བྱོང་བའི་ཐུག་པོ། ‘P’yag-na pad-mai ye-s’es-kyi sgya-’grul ’dra
paī ral-gar mk’an-ch’os sa-kyoṅ rgyal-po.

² *Jambudvīpa*.

³ This is a somewhat mythical king of northern Asia, but probably is founded on the great white Czar.

⁴ སྤྱོད་ཐོས་འབྲུང་མཁས་ཚྭ་ཁྱིམ་སྤྱོད། He seems to be a mythical person.

⁵ འཕས་མཁས་ཀྱི་འབྲུག།

⁶ Details of this legend are to be found in the *Mani-bkash-bum* and in the *Royal Chronicle*.—rGyal-rab sel-baī me-loṅ.

⁷ བྱ་རམ་ཤིང་པ། Bu-ram s’in-pa, literally ‘of the sugar-cane,’ the title of the founder of the Solar race, to which the Çākya tribe belongs. cf. Jäschke’s *Dict.*, p. 369.

⁸ མཁའ་འཁོར་ལོ་རྩིབ་བརྟམས། gNam ’k’or-lo rtsib brgyad.

lotus-flower.¹ The hill *Byaṅ-ñāṅ-bran-pal-po* with the (divine) umbrella on its head, the hill *Mal-groṅ* with the (lucky) fish in its eye, the hill *Bol-mar-dog-lte* or the *Rag* rock, the *mDor-mk'ar-gyi-brag* with the (lucky) lotus in its tongue, the *Ñān-bran-'p'an-dkar* (hill) with the (lucky) conch-shell in its breast, the pass of *La-grib-kyi-'k'yags-pa-dkar-ch'uṅ* also called *rDsoṅ-btsan* hill with the (lucky) vase in its neck, the hill *Yug-ma* with the (lucky) diagram 'Śrī-beu,'² in its breast, in the north-east the hill *rMog-lco'g-brag* formerly called 'K'ol-mar-gdugs with the (lucky) banner in its trunk, and the hill *sTod-luṅ-brāṅ-p'u* with the (lucky) wheel at its foot.

"In the centre of this wondrous land, and encircled in this way by 'the eight glorious signs,'³ lies the palace of the king of the *Çākya*s—(Lhāsa), the *viḥāra*⁴ of *Ra-sa-'p'rul-snaṅ*⁵—which was founded solely for the happiness and the guidance of all the animal beings, and for enlightening their gloomy path, even as the light of the sun and moon dissipates the foggy mist.

"In order to found the school or *viḥāra* on a lucky site, the Nepalese queen (of King *Sroṅ-btsan*) sent a maid to his Chinese queen (who was skilled in astrology) requesting her to ascertain by careful computation, a lucky site for the erection of the school. The Chinese queen gave the necessary information, calculated according to the Chinese reckoning of 'the 80-Spor-t'aṅ'—⁶; but the maid seems to have forgotten the proper reply. So attempts were made to fill up the lake (of *Ra-sa* or 'O-t'aṅ,' the site of the present cathedral of Lhāsa), but they proved unsuccessful (owing to the machinations of devils). The envious Chinese queen, without permission of the king, laid the foundation (of a temple or school) at *La-gdoṅ-neu-t'aṅ* which however the spirits⁷ destroyed utterly during the night.

"Then the king, with his wife *Bhr̥kuṭi*, went to the further side of the lake *O-t'aṅ*,⁸ and he threw up skywards a ring which descended

¹ ས་པད་མ་འདམ་བུ་ | *Sa pad-ma 'dab-brgyad.*

² དཔལ་བུ་ | the so-called 'Buddha's intestines,' see my *Buddhism of Tibet*, pp. 393 and 394.

³ Skt. *Aṣṭamaṅgala*. See my *Buddh. of Tibet*, pp. 392 *et seq.*

⁴ བུ་སྐྱེ་ལུ་ལྷ་སྐྱེ་ | *gTsug-lag k'aṅ*; a school or academy, also a *Vihāra*, conf. *Jäschke's Dict.*, p. 433.

⁵ ར་ས་པ་རུ་ལ་སྐྱེ་ | *Ra-sa p'rul-snaṅ.*

⁶ སྐྱེ་པ་ལ་ལྷ་སྐྱེ་ | *sPor-t'aṅ brgyad-c'u.*

⁷ མི་མ་ཡིན་ | *Mi-ma-yin* = 'not men.' (Skt. *Amanusha*).

⁸ འོ་ཐང་ |

exactly in the middle of the lake, whence a *caitya* of many colors sprung up. This (miracle) was witnessed by the chief ministers. By the solemn prayers of the king, combined with the stones thrown into the lake by the energetic ministers and people, a firm slender stone *caitya* was formed, which was supported on pillars, and the lake was filled up successfully without further difficulty. [And on this lacustrine site the temple of Lhāsa was built].¹

“But for want of the precautions pointed out by the Chinese queen, the demons destroyed the building. So that when the king heard of the astrological account of the Chinese princess by which the building could be preserved he was overjoyed, and he then with the aid of his two queen-consorts built a nine-storeyed house of solid masonry at sKyid-s’ad-ñan-bran-p’a’-bon;² and they remained there for a week coercing ‘the three Lords,’³ who appeared unto them in a vision and blessed them.

“Then he (king Sron-btsan-gam-po), erected four schools⁴ at each of (the sites of) mT’ah-’dul, Yan-’dul, and Ru-gnon, after making a careful survey of all the unlucky features of those lands. He also founded the school of (Lhāsa) Rā-sa-p’rul-snan, by the help of his incarnations and his Tibetan subjects. Then followed the erection of the school of Ra-mo-ch’e.

“(In the temple of Lhāsa or ‘Rasa’) there is a side painting of the five *Jinas*⁵ consecrated by the rice⁶ of the king (Sron-btsan) himself, as a symbol of the (mystic) Body⁷; and the six-syllabled prayer (i.e.,

¹ A popular tradition is still current that there is a lake under the temple of Lhāsa, and that an opening underneath the great image of the Lord (*Jo-wo*) in the central shrine, communicates with this lake. The story is probably related to the indigenous *Nāga* or dragon-worship of the country. Mr. Rockhill (*loc. cit.*, p. 70) notes a legend to the effect that this lake was confined to its present bed by Padma-sambhava after which only did it become possible to build over it—though this would place the erection of the temple over a hundred years after Sron-btsan sgam-po’s reign. ‘Every year,’ says, Mr. Rockhill ‘in the second month precious offerings are thrown down the hole in the Jo-k’ang out of which comes a great noise of wind. If this were not done, the waters or rather the Lu-jyal-po (*Nāgarāja*) would cause the waters to rise up and engulf the city.’ On this legend conf. Huc’s *Souvenirs d’un voyage*, II, p. 193.

² The building to which this legend attaches still exists close to the north of Ramo-che on the northern outskirts of Lhāsa.

³ Rigs-gsum mgon-po. See before.

⁴ gTsug-lag k’añ.

⁵ ཅུ་པ་རྒྱལ་པ་ལྔ་ | rGyal-wa rigs lña; the five Celestial Buddhas or ‘the *Dhyāni* Buddhas of the Nepalese’—See my *Buddhism of Tibet*, pp. 336, 346, &c.

⁶ Sacred objects are consecrated by throwing rice at them during a celebration.

⁷ རྩ་ sKu literally ‘the body.’ This together with the next two categories namely gSun (speech) and T’ugs (mind) denote the three mystic elements of the *Vajrayāna* creed. Cf. my *Buddh. of Tibet*, p. 147.

Om-ma-ni-pad-me-hūṃ) of “the Great Pitying One” (Avalōkita), as a symbol of (mystic) Speech; and as a symbol of the Mind, a *caitya* made by Sā-skyā Paṇḍita, enshrining small images of the king.

“(The following images were) made by the *yogi* *gZ’is-ka*, namely the great translator *Rin-ch’en-bzaṅ-po*, *rGyal-mts’an-dpal-bzaṅ*¹ of *sBah-ra-dPal-p’ag-mo-gru-pa-rdo-rje-rgyal-po*,² *Seṅ-ge-rgyal-mts’an*³ of *mNah-ris*, *Saṅs-rgyas-dpal-bzaṅ* of *Gyab-p’ug*, the reverend *Mi-la-ras-pa*, *’Gro-wai-mgon-po* of the *Z’aṅ* family of *gYu-brag*, and *Z’ig-pa-bdud-rtsi* now called *Mahākāla*.

“Above these images is the Muni⁴ (*Çākya*), and a little below is *mDol-ch’uṅ-dKor-dpon*.

“Over the door of the northern *gandhakūṭa* (chapel)⁵ are images of the omniscient (Grand-Lāma) *bSod-nams-rgya-mts’o* and ‘the three (divine) Lords’ made by the chief *bkRa-s’is-rab-brtan* of *sKyod-s’od*.

“The image of the eleven-headed ‘Great Pitying One’ (*Mahākaruṇa*)⁶ was thus obtained: In order to avert impediments to the building of the school, prayers were offered to the tutelary, and in reply a voice was heard saying that if an image of *Mahākaruṇa* were made about the size of the king’s own body all desires would be fully realized. So the king procured a branch of the *bōdhi*-tree, the fragrant *birana*-grass of the island, sand of the river ‘*Nairāñja*,’⁷ pieces of *sandal*-wood called the ‘dragon’s heart,’⁸ and *gos’irs’a* and earth from the eight holy places.⁹ These ingredients being mixed with many other holy substances, and washed with the milk of a red cow and a white she-goat were placed beneath his pillow while he prayed to Buddha and his disciples of the ten directions. Then he saw that innumerable gods, wild and fierce entered into the heap and disappeared. And next morning he found that the materials had become changed into an image of ‘the eleven-headed Great Pitying One.’

“Then he addressed the artist saying, “It is indeed marvellous that this image has been made so suddenly, but I had wished to put into it relics of ‘the seven Buddhas’ and the self-sprung *sandal*-wood image which was brought from India.” The artist replied, “This image has

¹ A Lāma of the Kar-gyu-pa sect.

² Also a Lāma of the Kar-gyu-pa sect.

³ A Lāma of the Ka-dam-pa sect.

⁴ ལྷ་པ་པ་ | T’ub-pa.

⁵ བཀྲ་ཤིང་ཁང་ | gTsaṅ-k’aṅ.

⁶ ལྷ་པ་པ་ཆེན་པོ་ | T’ugs-rje ch’en-po. ⁷ The ‘*Lilājan*’ at Budh-Gaya.

⁸ ལྷ་པ་པ་ | sBrul-sñiṅ.

⁹ Apparently the sites of the eight great stupas which were built over Buddha’s relics.

not been made by me. It is self-sprung.” And no sooner had this conversation ceased than the under-vest of the image was seen to be folded up to the thigh and rays of light darted out from the soles of the feet and attracted the (sandal-) image and the relics which were thus taken up and disappeared by absorption into its breast.

“Afterwards, when the gods and *rakshases* gathered at the foot of the poison-tree at the western ‘Moon-grove’¹ and intrigued to injure the devotees of the (new) religion, the (image of) *Mahākaruṇa* smiled, and two rays of light darted out from his mouth. One of these became the fierce fiend *bDud-rtsi-’kyil-pa* who seized the abode of the wicked demons and sanctified it by surrounding it with *vajra*-thunderbolts and the other became (the fiend) *Hayagrīva*² who drove the gods and *rakshasas* to the other side of the ocean.³ Then the self-sprung image of the *Arya* (*Mahākaruṇa*) and the images of the king and his two consorts disappeared by absorption into that of *Hayagrīva*, hence the image is called ‘the self-sprung pentad.’⁴

“The retinue of this image, which were made during the lifetime of the king (*Sron-btsan*) are, on the right, *Lōkēṣvara*,⁵ *Bhr̥kūṭi*, *Sarasvatī*,⁶ and *bDud-rtsi-’kyil-pa*; and on the left, *Khasarpāṇi*, *Tārā*, *Marīcī*,⁷ and *Hayagrīva*. Amongst these *bDud-rtsi-’kyil-pa* and *Hayagrīva* are very important and impart great blessing, as they routed the evil spirits who impeded the building of the *vihāra*. The *siddhi dNos-grub* and the ruler *Ñan-ñi-ma-’od-zer* took out *Mahākaruṇa*’s prayer-wheel,⁸ from beneath the right leg of *Hayagrīva*, which latter on that account has become slightly bent. On the right of *Hayagrīva* is *Mañjughōṣa*, and on the left *Vajrapāṇi* made by *Ch’al-pa-k’ri-dpon*. But the (foregoing) set of nine images, came to this northern *Gandhakūṭa* (chapel) from (the Indian) *Potala* of their own accord.

¹ ལྷ་པ་རྩེ་ལྷ་མོ། *zLa-ba ts’al*.

² རྩེ་མ་གྱིན། *rTa-mgrin*.

³ This reference to the ocean is interesting in connection with the Brahmanical myth of *Hayagrīva*, which makes *Hayagrīva* a demon of the ocean. Cf. Dowson’s *Hindu Mythology*, p. 36.

⁴ རྩེ་མ་གྱིན་ལྷ་མོ། *Raṅ-byon lṅa-lḍan*.

⁵ རྩེ་མ་གྱིན་ལྷ་མོ། *Jig-rten dbAṅ-p’yug*. A form of *Avalōkita* as an earthly prince. Most of the images of deities, demons and saints referred to in this account are described in some detail in my *Buddhism of Tibet*.

⁶ རྩེ་མ་གྱིན་ལྷ་མོ། *dbyAṅs c’an-ma*.

⁷ རྩེ་མ་གྱིན་ལྷ་མོ། *’Od-zer c’an-ma*.

⁸ རྩེ་མ་གྱིན་ལྷ་མོ། *Ch’os-skor*; it also means ‘preaching.’

“As we emerge (from the chapel) these images are placed in the outer court-yard of the *gandhakūṭa*, namely the revelation-finder¹ King T'aṅ-ston,² made by himself, the holy Buddha, the *siddhi* Birwapa,³ and the great Kāçmīrī *Paṇḍit* Çākyaçrī.

“Above the door of the building sit the Buddhas of the three periods.

“The translator Zaṅs-mk'ar,⁴ who transmitted the holy religion to this snowy land by translating the Sanskrit books into the Tibetan language, made an image of the reverend lord Maitrēya,⁵ from the earth which had been wetted by the stream where the King (Sroṅ bstan) and his two consorts used to bathe, and he named it 'the bathed or baptised *Maitrēya*.'⁶

“In the lap of Maitrēya are the sandal-wood image of Mañjuçrī offered by the *mGo-yod* temple and the white *Amitāyus*, the tutelary image of the *Śuvarṇadvīpa*⁷ monk who was the teacher of Atiça,⁸ also *Vajrapāṇi*, the four-armed *Avalōkita*, the *Jina* Tsoṅ-k'a-pa, the funeral urn⁹ of Legs-paī-s'es-rab (the Lāma of) *dKon-gñer-dpon* who is the author of the Chronicle of the Kings,¹⁰ (and of) *Arya Tārā*, (? and of) the *çlōkas* written for the remission of the sins of the butcher *rMa-ru-rtse*, the funeral urn of *bTson-'grus-sñiṅ-po* of *mNah-ri*, and the votive stone-lamp-bowl called 'the glorious shining fire' which belonged to the *Jina* Tsoṅ-K'a-pa.

“There also are the bathing slab of piled-up lotuses,¹¹ on which the king (Sroṅ-btsan) and his two wives bathed, the image of the great doctor, the omniscient *Çānta-rakṣita*, and *Padma-saṁbhava* who knows the (events of the) three times (the present, past and future). These

¹ གཏུང་སྟོན་ | *gTer-ston*. Conf. my *Buddh. of Tibet*.

² བླ་མ་ལྷ་མོ་ | This is a *Ñiṅ-ma* Lāma who is famous as having built several of the still extant iron suspension-bridges across the the *Tsaṅ-po* and other rivers in Tibet.

³ An Indian monk before the 11th century, A.D.

⁴ རྩ་མོ་མཁའ་ལྷ་མོ་ |

⁵ རྩ་མོ་མཁའ་ལྷ་མོ་ | *rJe-btsun byam-mgon*.

⁶ བླ་མ་ལྷ་མོ་མཁའ་ལྷ་མོ་ | *bYam-pa k'rus-mdsad*.

⁷ From the Burmese monastery of 'Thaton' (or Chersonesus) near Maulmain.

⁸ མཁའ་ལྷ་མོ་མཁའ་ལྷ་མོ་ | *mÑam-med jo-wo ch'en-po*.

⁹ གཏུང་རྩ་མོ་ | *gDuṅ-rten*.

¹⁰ གཏུང་རྩ་མོ་མཁའ་ལྷ་མོ་ | *rGyal-rabs gsal-baī me-loṅ*.

¹¹ བླ་མ་ལྷ་མོ་མཁའ་ལྷ་མོ་ | *K'rus-rdo padma spuṅs-pa*. This slab, I am told, is circular in shape and about five feet in diameter.

last three (images) were made by the revelation-finder Padma-glin-pa, and the *Jina Bhaisajyarāja* ¹ made by Ne-ch'aṅ-dī-pa.

“ Within the iron grating (lC'ags-K'ra)² are the following images (all of solid gold, it is said), namely :—The precious image of the great religious king Tsoṅ-K'a-pa who is the Lord of the *Jinas* of the three periods. On the left of this image sits the lord Kun-dgah-bkra-s'is, Ti-s'ri Mahāyāna (a present) of the Chinese emperor Ta-miṅ-gan, Bu-ston-rin-po-ch'e made by La-ch'en-byaṅ-ch'ub-brtse-mo, rGyal-sras-t'og-med-pa, the noble holy Lāma bSod-nams-rgyal-mts'an who is the most venerable of all the descendents of Sa-skya, Mu-sras-pa rdo-rje-rgyal-mts'an, and rJe-druṅ ³ Raṅ-byuṅ-rdo-rje of the Kar-ma sect.

“ Also the following images :—The God ⁴ *Buddha Amitāyus*,⁵ who is the chief deity in the temple, *Avalōkita* with his retinue (namely) *Kṣitigarbha*,⁶ *Sarvanirvāraṇa viṣkambinī*,⁷ *Akāṣagarbha*,⁸ *Samantabhadra*,⁹ *Mañjuhōṣa*, *Vajrapāṇi*, and *Maitrēya*. These existed from the time of the king (Sroṅ-btsan).

“ As we emerge from the temple, there are in the court-yard images of the god, the angry ¹⁰ rMe-wa-brtsegs-pa. This fierce deity is specially honoured on account of his having miraculously routed the Chinese army of a million strong who came to invade Tibet and take vengeance on the minister mGar, upon the king's death. Then came the following images in order :—The religious king and his two wives in Chinese fashion, made by Ts'al-pa K'ri-dpon, and *Buddha Amōghasiddhi*-[(?) *darṣana*] ; ¹¹

¹ མཆོད་པོ་ཐུབ་པོ། sMan-paī rgyal-po = the medicine king. See my *Buddh. of Tibet*, p. 353.

² See reference in the introduction.

³ རྗེ་དྲུག་། rJe-druṅ is a title meaning literally 'near to the noble one (i.e., Buddha).' It is restricted to those Lāmas who are deemed to be re-incarnations of Bodhisats or saints. It is not to be confused with 'T'se-druṅ' which is a title of the immediate servants of the Dalai Lāmas. The word 'T'se,' literally *head* here stands for the Dalai Lāma and 'druṅ' = near. The corresponding personal servants of the temporal ruler of Lhāsa, the Tibetan king, are called Z'al-druṅ.

⁴ ལྷ། lha. All the Buddhas and the chief Bodhisats are called 'gods,' but not so most of the demoniacal protectors (Ch'os-skyoṅ).

⁵ སངས་རྒྱལ་མཚན་པོ་མཆོད་པོ། Saṅ-rgyas snaṅ-ba mt'ah-yas. See my *Buddh. of Tibet*, p. 350.

⁶ }
⁷ }
⁸ } For these 4 see *Buddh. of Tibet*, p. 358.
⁹ }

¹⁰ རྗེ་པོ། See *Buddh. of Tibet*, p. 334.

¹¹ མཐོང་པོ་དེ་མཆོད་པོ། comp. *Buddh. of Tibet*, p. 349, &c.

and on the altar ¹ of the Lord is the noble Zan-Yangs, ² a Chinese name, (? who made) the four great kings (of the quarters) and two pillars, and on the door are the Yak-horns with which the reverend Mila (-ras-pa) worked miracles on the plains of Pal-moī-dpal-t'aṅ.

"There is an image of the omniscient son of *Çuddhōdana* (i.e., of Prince Siddhārtha, and it is now considered to be the greatest image not only in this temple, to which it gives its common name, namely "Jo-wo K'aṅ" or "the temple of The Lord," ³ but it receives more homage than any other image in Tibet). It is (a representation of the Prince) twelve years of age ⁴ and was made by the (divine) artist Viçvakarma, from the ten kinds of gems gathered by *Indra*, the king of the gods. This (image) has done a great deal of good to both gods and the animal beings, and especially to those of 'Odi-yāna (Udyāna), known in Tibetan as 'P'ur-'gro, which (word) has now its corners broken into 'U-rgyan.' When this (image) was in the middle country of Magadha ⁵ it was invited to China and carried there in a ship from India by the lucky power of the Chinese king. Afterwards when Sroṅ-btsan-sgam-po sent his wise minister mGar to China to invite the Chinese princess 'Kong-cho;' and the Chinese were unwilling to give her to the Tibetans, mGar after much difficulty at last obtained her, while she, also unwilling to go, was only persuaded by mGar singing the praises of the king of Tibet, [here omitted]: but she besought her father saying: "O father! pray give me your tutelary god, Çākya Muni." Her father gave it to her, and it was brought to Tibet. It was kept in Rā-mo-ch'e (temple), till the reign of King Maṅi-sroṅ-maṅ-btsan, when there was a war between

¹ སྤང་ཕྱུང་། sPaṅ-lchog.

² དཔལ་ཐན་ཡངས་། This is the Chinese title of a Tibetan who made the images named above; this is not intended for Hiuen Tsiang the famous Chinese pilgrim and geographer, whose image appears to have been added subsequently to the date of the record here translated. Hiuen Tsiang, as noted by Rockhill (*loc. cit.*, p. 282), is known to the Tibetans as T'aṅ-Tseṅ Lāma (ཐང་ཅེན་ལ་མ་) ། or "The Lāma Tseṅ of the T'ang period. And his image is now in the Lhāsa Cathedral." "On the front of the wall of the verandah (? of the Jowo-k'aṅ) is painted the master Yüan-chuang (= Hiuen Tsiang) of the T'ang period and three of his disciples searching from the sacred books." — Rockhill's translations from the Chinese, *loc. cit.*, p. 263. Cf. also KOPPEN, (*Die Lamaische Hier.*, p. 337 following KLAPROTH).

³ The image is called Jo-wo Rin-po-ch'e or 'The precious Lord.'

⁴ It is said to be about four and a half feet high — that is to say the natural size, for a boy of his alleged age.

⁵ དབྱུང་ཡུལ་མ་ག་ཏ་། dbUs-'gyur ma-ga-dha.' But the Chinese history (Rockhill, *loc. cit.*, p. 263), says "it is said that it was cast by a Chinese from Tso-lang."

the Chinese and Tibetans during which it was removed (for greater safety) into the Lho-sgom-loṅ-c'an (temple) and the door (of its shrine) was plastered with clay and (the name) *Mañju-ṣrī* written on it (in order to mislead the Chinese). Then after two generations, the Chinese princess who was brought as the spouse of 'Jaṅ-ts'a-lha-dbon went to Ra-mo-ch'e, but having missed seeing (the image of) Ṣākya Muni there, she fetched it from Lho-sgo-me-loṅ-c'an, and placed it in the middle of the *gandhakūṭa* chapel.

"On the left of this image is *Maitrēya* and on the right *Mañjughōṣa* made of bell-metal. Behind it is *Buddha Dīpaṅkara*, and the god 'Od-zer-'p'o-ba, now called Mi-'gro-gsuṅ-byon. Behind these is the image of *Muni Gaṅs-che'n-'tso-rgyal*² made by the translator Zaṅs-dkar. On the right of this are twelve *Sattvas*, and on the left are twelve female *Sattvās*. There also are the angry fiend Kaṅ-kiṅ, *Maitrēya*, and *Mañjughōṣa* made by gLin-p'yag-drug-dbon-po, the *Jina* Tsoṅ-k'a-pa, the funeral urn of sKor-dpon *Bodhisattva*, the big stone 'Amo-laṅ-k'a'³ taken by the *Jina* Tsoṅ-k'a-pa from the bank of a river, also the bells which Mo-hu-gal (Maudgalyāyana) caused his mother to ring and to repeat the *Maṇi* (formula) at Dril-gdaṅ.⁴

"In the outer courtyard of the *gandhakūṭa* (chapel) are the following images: Munindra,⁵ the great divine lord Dīpaṅkara Ṣrī-jñāna,⁶ the religious king 'Brom-ston, the translator Nag-ts'o, *Arya Tārā*, who is also called 'the scarf-taking *Tārā*,' on account of her having asked the 'P'ags-pa Rin-po-ch'e⁷ for the votive scarf which he was carrying, and the image of the *Bodhisattva* sKor-dpon.

"Within the *gandhakūṭa* (chapel) is the image of the reverend master Mi-p'an-mgon-po, of red bell-metal made by the religious king Kri-kri who was the dispenser of gifts to the Indian Ts'e-lo-ñi-k'ri-pa. The retinue of this image comprises *Tārā* as 'the defender from the eight Fears,⁸' and *Avalōkita* sems-ñid-ṅal-gso which existed during the time of the religious king (Sroṅ-btsan).

¹ ལྷི | Li.

² 'The Victorious Ocean of Snow.'

³ It is believed by Lāmas to be a jewel; probably it is the *Amalaka* (fruit-shaped) pinnacle of a temple.

⁴ འཇམ་མཛོད་ | Dril-ba = Skt. - *Utpadana* or *Utsadanam*. This incident probably refers to Maudgalyāyana's miraculous descent to the *Prēta* purgatory to relieve his mother. Conf. *Buddh of Tibet*, p. 98.

⁵ ཐུབ་པའི་དབང་པོ་ | T'ub-pa'i dbaṅ-po.

⁶ The religious name of the Indian monk Atiṣa.

⁷ Sa-skya Grand Lāma.

⁸ See my art. on The Indian Buddhist Cult of Avalōkita and Tārā, *J.R.A.S.*, 1893, p. 89.

“At the sides of the door are the images of *Brahmā* and *Sakra*¹ which were votive offerings at the founding of the *vihāra* of 'Od-'ch'aṅ-rdo-dpe-med-bkra-s'is-dge-'p'el by the governor³ K'ri-ral, who was an incarnation of Vajrapāṇi.

“In the outer courtyard are also, the *Jina Amitāyus*, Dol-so-pa of Jo-naṅ,³ the four-armed *Avalōkita*, *Padma-sambhava* who knows the three periods, and the religious king K'ri-sroṅ-lde-btsan.

“The side figures⁴ *Buddha Bhaiṣajyarāja*, the god 'Od-zer-'p'ros-pa, a row of the Buddhas of the three times,⁵ the great *paṇḍit* Bo-don-P'yogs-las-rnam-rgyal, sTag-luṅ-ṅag-dbaṅ-grags-pa, the king (Sroṅ-btsan) with his two wives made by T'sal-pa k'ri-dpon, the princess⁶ Mon-bzah-k'ri, prince Guṅ-ri-guṅ-btsan, the ministers T'on-mi, mGar and sNa-ch'en-po.

“Within the *gandhakūṭa* (chapel) are the following images: the four brothers Maitrēya⁷ made by the disciple⁸ K'a-ch'e Utpal from the silver extracted from the heart of (the god) Jambhala of the temple of rMe-ru,⁹ (which image had been made) by Paṇḍita Ts'ub-k'rims in the time of king gLaṅ-dar, the tutelary representation of Mañ-jughōṣa of king *Aṃṣuvarman*¹⁰, K'asar-pāṇi made by kLu-mes and invited from the Grub-mṅal temple, grain consecrated¹¹ by the eleven faced (*Avalōkita*, who lived in India during the time of) *Kaṣyapa Buddha*, *Vajra Sattva*, sToṅ-ch'en-rab-'byams, So-sor-'braṅ-ma, *Yama mt'ar-byed*, *Padma-mt'ar-byed*, bGegs-mt'ar-byed, the seven yellow and black (forms of) Jambhala¹² which existed during the time of the religious queen Ra-ma-rgya-mo, and consecrated food of Lha-rje-dge-ba-'bum.

¹ ཐུ་བྱིན | rGya-byin.

² མངའ་བཤམ | mNah-bdag.

³ This is the monastery of Tāranātha's sub-sect of the Sa-skyā sect. See my *Buddh. of Tibet*, p. 70.

⁴ ལྡམས་རིས | lDabs-ris.

⁵ དུས་གསུམ | Dus-gsum.

⁶ ལྷམ | lC'am.

⁷ རྩམ་པ་མཆེད་བཞི | bYam-pa mch'ed bz'i.

ཉེ་གནས | Ñe-gnas.

⁹ A temple on the outskirts of Lhāsa town to the N.-W. of the cathedral.

¹⁰ རྩེད་ཟླ་མེད་ | or 'Glittering Armour,' name of the father of Sroṅ-btsan-sgam-po's Nepalese wife. He reigned about 635-650 A.D. See my *Buddh. of Tibet* p. 20-n.

¹¹ See my *Buddh. of Tibet*, p. 368.

¹² རྩམ་གསུམ | Phyag-nas-ma.

“In the outer courtyard of the *gandhakūṭa* (chapel) are in order :— the *caitya* of superposed lotuses containing the image of ‘The sublime Gem’ (The Sa-skyā Grand Lāma),¹ the great *Siddhi* Bi-ru-a-pa, the great Sa(-skyā paṇḍit) Kun-dgah-sñiṅ-po, the reverend *bSod-nam-rtse-mo* (*N.B.*, this and all the following Lāmas in this paragraph are of the Sa-skyā sects), and the reverend Grags-pa-rgyal-mts’an, in front of which as side figures are *Mañjughōṣa*, the reverend Sa-skyā paṇḍita, ‘Gro-mgon-ch’os-rgyal-’pags-pa, *Mañjughōṣa Amōghasiddhadvaja*, the holy Lāma *bSod-nam-rgyal-m’san*, and the successors,² of the worshipful Sa-skyā. Then as side figures are pictures³ of ‘the red palace’ (the Grand Dalai Lāma’s residence), and ‘the iron hill’⁴ resembling the city of ‘the ten-headed *Raksha* of Laṅ-ka (Ravana), also a picture of a Tibetan festival.

“On the north and south of the Dragon-temple⁵ are, Buddha Bhagavān the king of the Nāgas, *Nanda*, *Upanda*, *Yakkha* Nāga Kuvēra, the *Gandharva* (-king) Zur-p’ud-lṅa-pa, Mahākāla and the ten-headed king of the *Rākṣas* of Laṅka. To the north and south of the inner and outer sandal-wood doors are (the friends) Tra-ka-s’ad and P’yag-ro made by Ge-re-bha-pa, sitting on the north is Drel-gz’on, and on the south is *Hayagrīva*. The incarnate S’ākya-’od extracted several *sūtras* from beneath the silk robe of the Nāga Kuvēra.⁶

“In the middle *gandhakūṭa* (chapel) of the middle storey⁷ in the west is the consecrated food thrown by the king (Sron-btsan) to the seven Buddhas, also (images of) the king and his two wives made by Lāma Duṅ-kar-’brug-grags, prince Guṅ-ri-guṅ-btsan and the *Jina* Tsonk’a-pa and his two disciples.⁸

On all the doors of the court-yards are images of *Buddhas* and *Bōdhisattvas*, and innumerable *maṇḍalas* containing relics. There especially are the gods Maricī (?),⁹ the white *Tārā* in the north and *Hayagrīva* in the west.

¹ See my *Buddh. of Tibet*, pp. 38 and 241.

² གཏུང་བཟྱད | *gDuṅ-brgyad*.

³ བསྟན་པ | *bKod-pa*.

⁴ ལྷ་མོ་པོ་རི | *lC’ags-pô ri*.

⁵ ལྷ་ཁང་ | *kLu-k’aṅ*.

⁶ སྐུ་མཆོག་ | *S’am-t’abs*.

⁷ The *Gandhakūṭa* is in three tiers.

⁸ These are *rGyal-tsab-rje* and *mK’us-grub rje*. See my *Buddh. of Tibet*, p. 59.

⁹ འོད་ཟེར་འཕྲོ་སྤྲོད་པའི་ལྷ་ | ‘*Od-zer ’p’ros-pāi lha* = the god of the pouring-forth-rays of light.’

the Lāmas about *Mañjuṣrīghōṣa* and the Lord *Maitrēya*, and various other pictures mostly derived from the *Sūtras*. These were painted by a Chinese artist. Other pictures are the successors of the noble Sa-skyā (Lāma) and the royal descendants of the Mongol Jīṅ-gir ('Jenghiz Khān.')

In the outer court-yard are *Vaiṣṇavana*, sPrin-gsel-ma, and the four *Mahārājas* (of the quarters). These were consecrated by the reverend holy Lāmas and the lucky governor¹ P'ag-mo-gru-pa.

A (hidden) treasury² of books, gold, silver, copper and iron, is near 'the leafy pillar'³ and is the means of (? gratifying) every wish of the four quarters of the world. Near 'the snake-headed pillar' is a treasury of bewitching spells⁴ which soften the injuries of war and rebellion. Near the lion-headed pillar is a hidden charm-letter⁵ for cattle by which essence is introduced into food. The snake-charm of the precious Ratna-deva which is in the *Nāga*-temple below, causes the cattle to prosper. The chest of gems⁶ of the precious sTag-s'a⁷ deva causes ornaments, clothes, grain and wealth to increase. And the begging bowl of Vaidūrya (*lapis lazuli*) which is in the *Nāga*-temple gives abundant riches. Again, numerous treasures are in the right thigh of the Yakṣa *Nāga* Kuvēra, below the great *maṇḍala*.

At the time when the will of the king (Sron-btsan) was concealed in the hidden treasury, prayers were recited upon the advantages of repairing the *gandhakūṭa* in the future. And according to the prophecy, the *Yōginī* S'as-pai, by the aid of the *Dākinī* extracted the will 'bKah-K'olma from its treasury in the leafy pillar, at the time when Atīṣa was writing a history of the *gandhakūṭa*. * * * * *

Outside the middle circular road⁸ is the temple of *Tārā*⁹ built by Ṇag-re-rin-ch'en-grags. In this temple of the *Ārya* (Tārā) is the image of *Avalōkita* with the thousand arms and eyes,¹⁰ made of bell metal, and *Maitrēya* facing the market-place,¹¹ both made by the reverend

1 མཐུན་རྒྱུ་སྡེ་སྤྱད། mTun-rkyen sde-srid. 2 གཏེར། gTer.

3 ཀ་པ་སྤོང་གོ་རྩ་། Ka-ba-siṅ-lo-c'an.

4 རྒྱུ་སྡེ་མཐུན། dRags-sṅags-mt'u. 5 གཤམ་ཡིག། gYañ-yig.

6 གཙེ། gzi.

7 སྤུང་ཤ། sTag-s'a literally = 'Tiger-flesh'; but it may be intended for the *Nāga* king 'Takṣaka'.

8 བར་སྐོར། Bar-skor.

9 རྒྱུ་མ་ལྷ་ཁང་། sgRol-ma lha-k'aṅ.

10 སྤུང་རས་གཙེ་ཤ་ཕྱུང་སྤུང་སྤུང་། spYan-ras-gzigs-p'yag-stoṅ spyān-stoṅ.

11 བྱམ་པ་ཁྲོམ་གཙེ་ཤ། bYam-pa-k'rom-gzigs.

bLo-gros-rgyal-mts'an. This latter image was made at the instance of king *bLon-gon* to stay the great plagues of the market-place.¹ At first its influence (for this object) was favourable, but latterly it failed to exert any beneficial effect, or on wars and quarrels. The history of this is clearly written in the revelations of the re-incarnated *Ratna-glin-pa*, the great *Paṇḍit* of *rNah-ris*, the great *Legs-ltan-rdo-rje*, and the head of the rosary² of revelation-finders *S'es-rab-'od-zer*.

In the eastern corner of the outer circular road³ is the stone image of (the goddess) *Lo-ma-gyon-ma*. This image was formerly placed on the western side to guard the hundred thousand circumambulators, from the injuries to which they are liable; but lately it was shifted to the south-east to guard against the damage done by the waters.⁴

There is also the fountain of milky nectar⁵ in the north, and the monolith high as the sky⁶ on the west, and the short earthy stone⁷ in the centre of the *maṇḍala* (which forms the *vajrāsana* seat of the image) of the Lord (*Jo-wo*).⁸

The *Vihāra* of *Ra-sa-'p'rul-snaṅ* (i.e., *Lhāsa*) is the *Vajrāsana* (*Buddh-Gayā*) of Tibet. It, with all its contents, is established, not only for the benefit of Tibet, but for the good of all mankind and also of the gods. When the great lord *Atiśa* came up from India to Tibet he saw the gods and goddesses making offerings here, in the plain of *Lhāsa*. The holy *Lāmas*, the kings, ministers and subjects of China, Tibet, Turkistan,⁹ *Nah-ris*, and *Ya-rtse* all rendered great homage to this *Vihāra*.

¹ These plagues were probably small-pox, which still ravages *Lhāsa* frequently.

² This evidently refers to the legendary revelations being accounted 108, the number of beads on a *Lāma's* rosary. See my *Budd. of Tibet*, pp. 202, &c.

³ སྐོར་ལམ་ | *sKor-lam*.

⁴ Apparently the floods of the *Kyid-ch'u* river. Here may be the river embankment called the "Spirit mound" mentioned by Mr. Rockhill (*loc. cit.*, p. 71):—"Every year in the first month, the priests of all the lama series assembling for the reading of the sacred books the *Jo-K'ang* carry some earth or stones and pile them up on this dyke." Though Mr. Rockhill notes that this obligation seems to hold no longer good.

⁵ བུད་རྩི་ལྷ་མོ་ | *bDud-rtsi o-ma*.

⁶ རྩི་ལྷ་མོ་ | *rDo-rin gnam*. It may also mean 'Celestial' monolith, as it is the well-known bilingual edict pillar erected as a treaty between the Chinese (Celestials) and the Tibetans in 822 A.D.

⁷ རྩི་ལྷ་མོ་ | *rDo-t'un sa*.

⁸ Water is said to ooze miraculously out from under the seat of the image of *Jo-wo*.

⁹ ཧོ་རྩི་ | *Hor*.

The king (Sron-btsan) ordered his grandson to offer here, always the first part of the earth and stone of any new *Vihāra* which was to be founded.

Ñan-s'ai-spyan, the receiver of gifts from the chieftain K'ri-ral and the minister 'Gas, made (the images of) Ku-ru and rMe-ru in the east, dGah-wa and dGah-wai-'od in the south, and residences and a temple in the north. They also founded classes of clerical persons.¹

Ril-po Mal, king of Ya-rtse, a pure descendant of the Tibetan king (Sron-btsan) covered the head of the precious Jo-wo with a golden crest,² and Prati Mal, son of the king of Ya-rtse, and the minister Çrī Kīrtti also covered the head with a golden ornament. The chief (of Ñari)³ mYan and the revelation-finder Ch'os-kyi-dbañ-p'ug, made enormous additions to the lamp-offerings. Lha-rje-dge-wa-'bum rebuilt the wall of the *Vihāra*, and obtained a round Chinese roof for the building. The translator Zan-mk'ar made a temple-*caitya*⁴ on the east and filled it with many images.

sGam-po-zla-'od-gz'on-nu gave a back-curtain.⁵ The master sGom-ts'ul rendered notable service. He obtained 'gRo-wai-mgon-po, of the Z'an family of gYu-brag who initiated him into the assembly and he founded classes of dMigs-paī ts'al-guñ. 'gRo-mgon-ch'os-rgyal offered pearls, corals and priests' robes.⁶ Sa-skya bzañ-po, the predecessor of the great Sa-skya lords asked the Nepalese Ara-ka-gu-i-guñ to make for him a tapestry which he offered to the precious lord (Jo-wo) as a back-curtain for his throne. Hu-la-hu, the son of the Mongolian king who was banished to sTod offered silver, the Ts'al-pa k'ri dpon — 'Os-dgah-bde-bzañ-po offered twelve big pillars and others, sixteen in all. Guru Ārya-dēva made the southern temple *caitya*, in the upper gallery. The great chief dbAñ-brtson made the enthroned glorious *caitya* of many doors.⁷ The governor P'ag-mo-grub-pa-tai-swi-tu-byañ-ch'ub-rgyal-mts'an, gave most offerings. Ta-min, the king of China, offered two robes⁸ of pearls, and also golden offering bowls. The great religious king Tson-k'a-pa offered a hand-ornament as prophesied. * * *

¹ རབ་ཏུ་བྱུང་བའི་སྡེ། Rab-tu byuñ-wai sde.

² གསེར་ཐོག་། gSer-t'og.

³ མངའ་བཤམ་། mNah-bdag.

⁴ ལྷོ་འབྲུང་། gLo-'bur.

⁵ ཐུབ་པ་ལ།

⁶ སམ་བྱུང་། sNam-sbyan.

⁷ རྩ་སྐྱོ་བཟའ་ཞིས་སྐྱོ་མང་། k'Ri-sgo bkra-s'is sgo-man, see my *Buddh. of Tibet*, p. 244.

⁸ sNam-byar.

The higher ranks of the people, formerly paid much respect to the *Vihāra* but latterly not so. On this account the *Jina*, Tson-k'a-pa ordered sNe-gdon-gon-mo-ch'an-po-dbañ-grugs-pa-rgyal-pa-rgyal-mts'an to restore this *Vihāra*, the *Vājrāsana* of Tibet, to its pristine splendour and adoration. The governor caused certain officials to carry out these orders.

At the feast of the show of Buddha's miracles,¹ held on the fifteenth day of the first month, great honor is paid to the assembly (of Lāmas) on the Rwa-chan benches,² food is offered the gods, and about 500 lamps, and robes are given to each of the images of importance, and golden-water³ and vast offerings of the best kind and of goods and men are made unto the great Lord (Jo-wo). * * * * * A golden crown is given to the great precious Lords and a silver one to 'the great pitying one.' Also to the Lord a silver begging-bowl and a horse-headed silver wine-cup⁴ extracted from a hidden treasury. Also stones from the hidden treasury of Ñañ-ser-sman are brought up and set upon the pavement instead of the old ones in the courtyard and in the circular road. * * * * * There was no one who equalled the *Jina* Tson-kā-pa in exertions at turning 'the noble wheel of the Law,' at Lha-ldan (Lhāsa) during the later times.

Again, spYan-sña-cho's-kyi-grags-pa poured praises on the throne of the Lord, the omniscient bSod-nams-rgya-mts'o gave a golden tapestry⁵ (as a canopy) for the Lord's head. Yon-ten-ch'os-kyi-rgyal-po offered a silver *maṇḍala* made by sToñ-rwa-c'an-pa, and a golden one by his son Buddha-s'ri. The re-incarnated Dug-pa⁶ (saint) Ñag-dbañ-nor-bu replaced (in a vertical position) the slanting image of 'the great pitying one,' the self-sprung pentad. 'Gah-z'ig-rañ-s'ugs remodelled 'K'ron's-'gro-rgyal which was said to be broken to pieces. The reverend Ch'os-rje of sTag-luñ and sKyid-s'oñ-sde-pa-bkra-s'is-rab-t'un-mon remodelled the loose golden crown of the Lord (Jo-wo). The omniscient Yon-ten-rgya-mts'o renewed the back of the Lord's throne.

¹ ཆོ་རྒྱལ་པུ་ཐུག་པའི་རྩལ་ཆེན། Ch'o 'P-rul bstan-pai-dus ch'en. See my *Buddh. of Tibet*, p. 503.

² དག་འཇུག་ཁྱི་རྩ་ཅན། dGe-'dun k'ri-rwa chān. These benches are close to the Jo-wo image; See my *Buddh. of Tibet*.

³ Water into which pieces of gold are put.

⁴ Though this cup is said to smell of wine no wine is now ostensibly put into it.

⁵ ལྷ་བྱེ། bLa-bre.

⁶ འཇུག་པ། 'bRug-pa, a sect of Lāmas.

He also painted 'the ten deeds'¹ (of Buddha) on the back curtain, the sixteen *Sthavira* on the middle 'radiant circle'² with molten silver, and the series of the Lāmas of the illustrious *dGah-ldan*³ with beaten gold in the inmost radiant circle, intersecting it with various gay colored jewels. The king *bSod-nams-rab-brten* of 'Jaṅs-sa-t'am built a two storied house with a Chinese roof of silver. * * * * * The government of the palace of *d'Gah-ldan* renewed the gallery⁴ and repaired the crown, and replaced both the outer and inner receptacles for the offerings also the hangings, canopies and *maṇḍalas*.

* * * * *

The six great Mongolian hordes with all the chief and petty lords, king Ju-naṅ, the chieftain *Huṅ-t'ai-ji* and the king *K'ar-k'a-t'u-s'ab-t'u*, collected about one thousand silver pieces and made a votive *maṇḍala* of them.

Innumerable instances also have happened of rich persons of the upper and lower *mDo* provinces who have offered golden votive bowls (as lamps), especially the chief *gYaṅ*.

The palace of *dGah-ldan* also added a new golden ornament above 'the four brothers *Maitrēya*'⁵ and regilded the lords of the fans,⁶ and the upper part of the *Nāga* king. Queen *Da-las-gun-ji* gave many and frequent gifts to the *Vihāra* and to the priests.

In short, every one high or low, from the vast middle land of *Magadha* and *Vajrāsana*, and from the great land of *Vaiṣālī*⁷ to this side of the inconceivably great ocean gave offerings according to their means, so that it is impossible to describe all in detail.

The virtue accruing to any one who merely sees this *Vihāra* and its contents is thus described by the king (*Sroṅ-btsan*) himself. "Once seeing it, closes the door of hell against that person. To see it twice, the person shall acquire the form of a man or god (in next rebirth) and ultimately obtain deliverance. To see it thrice overcomes 'the three poisons'⁸ and gains 'the three bodies' (*Tri-kāya*)."

¹ མཛད་བཟུང་། *mdsad-b'cu*, see Csoma's Analysis in *Asiatic Researches* XX, pp. 286, &c.

² ཆོད་སྒྲིལ་། *'Od-skor*.

³ དཔལ་རི་བོ་དགའ་ལྡན་། *dPal-ri-bo d'gah-ldan*.

⁴ མདའ་ཡལ་། *mDah-yab*.

⁵ ཐུམས་པ་མཆེད་བཞི་། *bYams-pa mch'ed-bz'i*.

⁶ མདའ་གཡམས་། *mṅah-gyabs*, the ox-tail fly-whisks.

⁷ ཡངས་པ་། *Yaṅs-pa*.

⁸ The *Trividhāgni* (*Dug-gsum*), a sort of triad of original sin — Lust, Ill-will and Stupidity, (*Rāga*, *Dvēṣa*, *Mōha*) somewhat analogous to our Devil, the world and the flesh. See my *Buddh. of Tibet*, p. 115.

The virtue accruing from hearing (about this temple), is such that a beast hearing of it, even in a dream, shall lose its bestial body (in its next rebirth) and so get nearer to the path of deliverance. If a god or man hears of it, he shall be delivered.

The virtue of merely remembering¹ it is such that anyone who recollects the good qualities of the tutelaries, becomes cleansed from the (accumulated) defilement of five thousand *kalpas*, and obtains endurance over human difficulties.

And anyone who circumambulates this temple with a pure heart, sows seed which shall procure him the grades of the *Dasabhumi*,² and 'the omniscient wisdom.'³ Even the revered (Indian) land of the *Vajrāsana* (Buddh-Gayā) and the shrine of the hidden treasure of the *Dākinīs* in *Udyāna* are not more important than this (temple). And anyone who comes and sees this temple and makes offerings here will find that it is equivalent to a pilgrimage and offerings to these famous (Indian) shrines.

The virtue of repairing the outside or interior of the temple, and of offering golden water, lamps, food for the gods, clothes, hangings and tapestry—(the virtue of this) is great beyond description. Such persons certainly shall be holy lords of men and gods, and shall ultimately attain the supreme *Mahābōdhi*.

The (image of) the chief god 'Munindra' was brought to this snowy land from China by *rGya-ch'en-dpag-yas-legs-pa*, and was placed in the bewitching⁴ *Ra-mo-ch'e*. The golden image of *Çākya Muni*, obtained from China as a (dowry) offering, was formerly kept in the *Ra-mo-ch'e* temple, but during the war (Tibeto-Chinese) it was removed to *Lho-sgo-me-loṅ-c'an* (for safety). Lately it was transferred to the central building of the temple of *Ra-sa*, while (the image of) *Mi-bskyod-rdo-rje* was placed in its stead at *Ra-mo-ch'e*.

The Tibetan king (*Sroṅ-btsan*) on sending his minister *mGar* and other ambassadors to Nepal to invite the Nepalese princess *K'ri-btsun* an incarnation of the Lady (goddess) *Khro-gñer-c'an*, to be his wife, she prayed her father, the king of Nepal, saying, "O father, pray let me have *Çākya Muni* as your (dowry-) gift, in order that he may guide me

¹ རྩོད་པ། *dRan-pa*.

² ལ་བརྒྱ། *Sa-bc'u*. The ten stages in the passage of a *Bōdhisat* to the *Buddha-ship*.

³ རྒྱ་མཎུ་པའི་སེམས། *Kun-mk'en-pai s'es*.

⁴ རྩོད་པ་པ། *rGya-btab*; to pronounce or cast a spell. The College of necromancy at *Lhāsa*.

in my journey to the barren land of Tibet." He replied "This (image of) Īākya Muni was the work of the (divine) artist *Viṣvakarma*, who made it from the various gems given by the king of the gods. This image imparts great blessings, and it was consecrated by the *Jina* himself." So saying he gave it to her. The image represents the *Jina* in his eighth year, and his dispenser of gifts was the king of the gods, and Buddha himself consecrated the image.

It is said that the images of Tāra as "the defender from the eight Fears"¹ in sandal-wood, and of 'the Great Pitying One' as *Sems-ñid-ṅal gso* are not at present here.

E-pa-dkon-mch'og-p'an-bde made two *caityas* containing the relics of 'the model pair'² (of Buddha's disciples) and the eight intimate disciples (of Buddha),³ during the time of the king. (He also made) *Vajrapāṇi* on the right and the angry-fiend *dbYug-sṅon-c'an* on the left of the door, and (he) also consecrated the *Jina* Tsoṅ-k'a-pa's image. In the courtyard he made the thousand Buddhas, (representations of) 'the twelve deeds (of Buddha),'⁴ and the side figures of the ten (or 16)⁵ *Sthavira*. Outside the courtyard is *mGon-po-se-donj-ma* made from rose-tree instead of axle-tree, though some call it *mGon-po-ved-dmar*. * * * *

dPon-sa-lho-ṅos-ma asked the reverend, *dPal-lhun-pa* where she shall be reborn after her death, and he replied that she will be reborn as a crocodile, but that this disaster may be averted by the assembly of priests reciting the Sūtra of the Medical Buddhas during the celebration of the Ch'o-p'rul. She paid the expenses of this recital for six days and by the virtue of these acts her birth as a crocodile was averted.

[A leaf, the 20th, is here wanting in my text and the 21st commences with a description of the Tibetan Potala, the Vatican of the Lāmaist pope.]

The lofty hill of *Avalōkita* looks like an elephant lying in its stall.

1 ལྷོ་ལྷོ་མ་འཕྲུལ་པ་བཞུད་ལས་སྐྱེ་བ་པ། *sgRol-ma 'jigs-pa bsgyad las skyob-pa*. See my art. in *J. R. A. S.*, 1894, p. 67.

2 མཚན་ལྷན་། *mCh'og-zuṅ*; namely, Āriputra and Mahāmaudgalyāyana. The Lāmas claim to have relics of these famous disciples, but as they also claim to have relics of the seven past Buddhas, six of whom are purely mythical, these pretensions must be taken for what they are worth.

3 འཕྲུལ་ལྷོ་ལྷོ་མ་འཕྲུལ་པ་བཞུད་པ། 'K'or ñe-baī sras brgyad.

4 མཚན་ལྷན་།

5 ལྷོ་ལྷོ་མ་འཕྲུལ་པ་བཞུད་པ། *gNas-bc'u*.

Its real name is 'the Red hill'¹ or Potala. The splendour of the palace on this hill was likened by the Nepalese princess 'K'ri-btsun' to that of the city of the ten-headed *rakshas* of Laṅka. There are 999 forts at the foot of the hill and 1001 on the summit, and in the centre is the palace of the king of Tibet.

In the *Vihāra* (of Potala) is some rice consecrated by the king (Sroṅ-btsan) which confers great blessings, on account of the Ārya Lokeṣvara having at that time appeared before the king in a dancing posture. Here are also images of the Chinese and Nepalese princesses, prince Guṅ-ri-guṅ-btsan, the ministers *mGar* and T'on-mi, and *Mañjuṣrī*, the six-faced *Yama* on the pillar. These blessed objects were consecrated by Buddha Kāśyapa.

There are also images of 'the six-armed (fiend),'² the tutelary of the *Yōgi* K'yuy-po,³ the eleven-headed (Avalokita), *Hayagrīva* Z'aṅ-rñiṅ-me-t'ub-ma which belonged to the king and his two wives, T'aṅ-sku-rwa-sgreṅ-me-t'ub-ma of *Avalōkita*. The king (Sroṅ-btsan) sent the monk A-ka-ra-ma-ti to Nepal. He arrived in a dense forest between India and Nepal where he saw a *sandal*-tree emitting rays of light in the ten directions. This tree he cut into four pieces which turned into the four brothers, Ārya 'pawati,' Ārya 'dbU-k'aṅ,' Ārya 'Jah-ma-li,' and Ārya Lokēṣvarat, the last of whom was invited to become the receiver of gifts⁴ from the Tibetan king. He therefore came (to Tibet) and abode at 'the red hill, and at a later time he was invited by sKyid-s'od-sde-pa-gyul-rygal-nor-bu to *gZ'is-ka-brag-dkar*.

Long afterwards, Se-ch'en-t'ai-ji of T'u-med, invaded many villages in Tibet. At that time the troops of the heaven-appointed religious king *bsTan-'dsin*, of great fortune, were victorious; and brought under their power all the kingdoms of Tibet (proper) and Great Tibet (Eastern Tibet). When *dGah-ldan* and the religious king *bsTan-'dsin* held the Government, the receiver of gifts, the sun (the Dalai Lāma), and the moon (the king) ruled over the entire country, and the prophecy of the great *Guru* Padmasambhava, the sage of O-di-ya-na (Udyāna), was fulfilled. The land was blessed by the virtue of the *Kālacakra* (doctrine) on the glorious day of the Nag-pa *caitya* in the beginning of the year of the *Kālacakra*, in the female wood-fowl year of Sa-kyoṅ.

And the foundation of the great palace (of Potala) was laid in the first festival of the middle month of Za-ga (Baisāk), and under most illustrious auspices. The queen Da-las-gun-ji with her wonted zeal and perseverance brought from a foreign country the queen *mTs'o-k'ri-s'ag*,

¹ དམར་པོ་རི། *dMar-po ri*.

² ཡུ་ཁ་རྩ་ལ། *p'yag-drug-pa*.

³ རྩུང་པོ། = *Skt. Garuḍa*.

⁴ མཆོད་གསུམ། *mCh'od-gnas*.

who admitted the precious image into communion, and at the same time a letter arrived from the reverend Mañjuçrī and sBa-bal-ch'e-s'i-pa-gan-ja.

When the precious image (of Avalōkita) was removed from Lhā-ldan to Potala, all the clergy and populace gave large offerings, which I myself witnessed. Even the gods gave offerings, as was seen in visions. Flowers rained (from heaven) and rainbows filled the sky with splendid rays. The image of the precious one (Avalōkita) was placed in the palace of 'the entirely victorious one on all sides'¹ so as to be the lord of all the images and it was attended 'by the noble burning ocean of virtue.'²

This catalogue, mirroring clear as crystal, the transformed *Vihāra* of Lha-ldan, the Vajrāsana encircled by snowy mountains, has been written by Nag-dbañ-blo-zañ-rgya-mts'o, the fearless one armed with the doctrine,³ who is descended from the race of Zahor and once (in a former birth) the minister of Pa'g-mo-grub-pa the king of gNam-bskos' and (formerly) the great Sah-la-pa of the Indian royal race, at the palace of dGah-ldan-p'yogs-t'ams-ca'd-las-rnam-par-rgyal-ba, at the request of the stewards in charge of the images of the *Vihāra*, at the beginning of the year of Sa-kyon, in the Chinese court, on a most auspicious day of the first glorious part of the course of the zodiac around the constellation Ñe,⁴ Vagendras'seyo ! Mangalam.

¹ ཐུགས་ཐམས་ཅད་ལས་མཐོ་པར་སྤྱུང་བ། | p'Yogs t'ams-c'ad las rnam-par-rgyal-ba. This is the Chapel-royal of the Grand Lāma.

² དགེ་མཚན་གྱི་མཆོད་དཔལ་ལྷན་ཅུ་འབྲེལ་བ། | dGe-mts'an rgya-mts'oī dpal-kun-tu 'bar-ba.

³ འཇིགས་མེད་གོ་མ་གྲུབ་པ་ལྷན་ལུང་རྩོ། 'Jigs-med go-ch'a t'ub-bstan lan-tsô.

⁴ ཉེ།

Note on Viṣṇupur Circular Cards.—By HARAPRASĀD SHĀSTRĪ.

A pack of the circular Viṣṇupur Cards consists of 120 pieces, divided into 10 groups of 12 each. The groups are named after the ten incarnations of Viṣṇu; *viz* :—(1) the Fish, (2) the Tortoise, (3) the Boar, (4) the Man-lion, (5) Buddha, (6) the Dwarf, (7) Paraçurāma, (8) Rāma, (9) Vala-rāma, (10) Kalkī. The first five of these incarnations have four hands, and the other five two hands. The kings, or rather the *Avatāras*, are distinguished from their ministers by having two attendants and being set in a 'room' or frame. The ministers are represented by the *Avatāras* without these accompaniments. Besides kings and ministers there are ten plain cards in each group, with one to ten 'pips' on each. In groups presided over by four-handed *Avatāras* the highest value is given to the ten, and so downwards, the ace having the lowest value. In groups presided over by two-handed *Avatāras*, the reverse order prevails, the ace being the highest card and the ten the lowest.

Of all the incarnations Rāma is regarded as the most powerful; and he wins in a group of five players ten cards, two from each player, as explained below.

The minor cards of the Fish incarnation are marked with fish, those of the Tortoise with tortoises, those of the Boar with conches, those of the Man-lion with discs (*chakra*), those of Buddha with lotuses, those of the Dwarf with waterpots (*kamaṇḍalu*), those of Rāma with arrows, those of Bala-rāma with clubs, and those of Kalkī with swords.

The number of players is five. The pack is first shuffled by the dealer, and the cards are cut by the right hand player. The dealer deals four cards at a time, beginning with his right hand player, and six rounds are dealt. If there is no misdeal, that is, if all the five get 24 cards each, the play commences; if not there is a fresh deal.

The player who has got Rāma leads. He plays along with Rāma a plain card, and such is the power of Rāma that he wins both the tricks, that is ten cards. He has the privilege of leading again or ordering some other person to lead. Whoever wins always enjoys this

ERRATA.

- P. 238, ll. 6 and 7 from bottom, for *Çr Çr*, read *Çrî Çrî*.
 239, „ 9 and 10 „ *Çr Çr*, „ *Çrî Çrî*.
 244 and 245, for every *Cr* read *Çrî*.
 309, l. 22, from top, for *harēndē*, read *karēndē*.
 „ l. 3, from bottom, for *sunḍi* „ *sunī*.
 313, l. 10, „ *āyosē* „ *āyōsē*.
 „ l. 9, „ *āyovē* „ *āyōvē*.
 „ l. 8, „ *āyō hē* „ *āyōhē*.
 323, l. 5, from top for *hāuj* „ *hā*.
 327, l. 13, „ *hō* „ *hun*.
 329, l. 23, „ *asādē* „ *assādē*.
 „ „ „ *salā* „ *salām*.
 363, l. 17, from bottom for *māry-va* „ *māryu-va*.

privilege of either leading again or calling a lead. As long as there are kings and ministers in the leader's hand they must be played. After the kings and ministers of a hand are exhausted, plain cards may be led, though other players may have kings and ministers in their hands.

After the game is over the cards of each player are counted. The player who has more than 24 cards, gets one pice, or one anna, or one rupee, according to the stake, for each card above 24; and one who has less than 24, pays at the same rate.

ANTIQUITY OF THE GAME.

Tradition has it that the Malla kings of Viṣṇupur invented this game when they were in the zenith of their glory. The Malla Rājās have left behind them an era of which 1201 corresponds to 1895 A.D., and I fully believe that the game was invented about eleven or twelve hundred years before the present date. The reasons for my supposing so are these :

(1) In the orthodox list of the ten incarnations Buddha's place is the ninth. But in the order of the cards, he has the fifth place assigned to him, or rather, he is one of the first five, having four hands. The antiquity of the orthodox list goes back to Jayadēva in the 12th and to Kṣēmēndra in the 11th century. These cards must therefore have been invented before the formation of the orthodox list, at a time when Buddha was regarded as an incarnation, but held a place in the list different from that now assigned to him. The reason for giving him the fifth place may be well surmised. Buddha, as represented in the card, is an unformed mass, with only a human head and human hands. He may, therefore, very well come between the Man-lion, which is half man and half animal, and the dwarf, who is a complete man, but not fully developed. And so in the gradual development from the lowest animal to the most fully developed human being, as represented in the list of incarnations, Buddha may very well occupy the fifth place.

(2) The plain cards of Buddha are represented by lotuses. The cards must therefore have been invented when Buddha was known as *Padmapāṇi*, and the lotus was the most striking of his emblems ; and this was when the Mahāyāna School was in the ascendant in Bengal, that is, during the reign of the Pāla Kings from 800 to 1200 A.D., or a little earlier. I do not think there are three Bengalis, at the present moment, who can explain why the lotus is depicted on the minor cards of Buddha.

Notes on some Āhōm Coins—By E. A. GAIT.

(With Plate XXVII.)

(Read July, 1895.)

I return herewith six coins in the old Āhōm character belonging to the Society, which were sent to me some time ago for decipherment. They have been read by a young Assamese named Golāp Candra Barua, who has been appointed under the orders of the Assam Administration to learn Āhōm, and transcribe and translate the *puthis* in the possession of the tribal priests or Deōdhāis, which are all written in that language.

Number 1 is a coin of Çuklenmun; the reading is as follows:—

obverse चाओफा cāō phā
शुक्लेड सु Çukley mu
ड पिन् चाओ ṅ pin cāō
लाक्नि lākni
प्लेकडि plekṇi.

i.e., the great (cāō) king (phā) Çuklenmun reign (pin cāō) year (lākni) plekṇi (15th year of cycle).

reverse काओ kāō
बय फा bay phā
तारा tārā
हेउ चु heu cu.

i.e., I (kāō) the king (phā) offer (heu cu) prayer (bay) to the Almighty (tārā).

A gold coin with a precisely similar inscription was sent to the Society for exhibition some months ago.¹

Numbers 2 to 5 are coins of Çupātphā alias Gadādhara Siṅha. The reading is:—

obverse चोओ शु cāō ṣu
पात्फा पि pātphā pi
न् खन् लाक् n khun lāk
नि राय्शान् ni rāiṣān.

¹ See *Proceedings*, 1893, p. 146.

i.e., the great (cāō) Çupātphā reign (pinkhun) year (lākni) rāiçān (33rd year of cycle).

reverse काञ्चो बय kāō bay
फा लेङ phā ley
डन हेउ dan heu
चु cu.

i.e., I (kāō) the king (phā) offer (heu cu) prayer (bay) to Indra (ley dan).

Number 6 is a coin of Çuneñphā alias Pramata Siṅha. The reading is :

obverse चाञ्चो शु cāō şu
नेञ् फा फिन् neñ phā pin
खुन् लाक्नि khun lākni
कात्केञ्चो kātkeō.

i.e., the great (cāō) Çuneñphā reign (pinkhun) year (lākni) kōtkōō (36th year of cycle).

reverse काञ्चो बय kāō bay
फालेङ ड phā ley da
न हेउ चु n heu cu.

or I (kāō) the king (phā) offer (heu cu) prayer (bay) to Indra (ley dan).

Efforts are being made to obtain a complete collection of Āhōm coins, so any lengthy discussion of the few already in the possession of the Society would be premature.¹ A short explanation of the dates on them may however be given. The Āhōm method of computing time is the same as that of the Chinese and Japanese, viz., by the larger Jovian cycle of 60 years, which the Āhōms call *tāochiya*. The true Jovian cycle of 12 years is said to be still in use in China for reckoning domestic occurrences.

Like the other nations mentioned, each year in the cycle bears a name and not a number, the name being formed by compounding words of two series, the former containing 10 and the latter 12 words. Thus the first year of the *tāochiya* is denoted by the combination of the first word of each series and the tenth by that of the tenth word in each series; in the 11th year the first series is exhausted and so that year is denoted by the combination of the first word of the first series and the 11th word of the second, the 12th by that of the second word of the first series and the 12th word of the second, the 13th by the third word of the first series and the first word of the second and so on.

The two series of words are given below, the corresponding words in Chinese and Japanese being added for comparison.

¹ [A coin of this series is illustrated by Marsden, No. MCCXXI. Ed.]

Denary Series.

Duodenary Series.

Serial No.	Āhōm.	Chinese.	Japanese.	Serial No.	Āhōm.	Chinese.	Japanese.
1	kāp.	kêa.	kino-je.	1	yi.	toze.	ne.
2	dāp.	yih.	kino-to.	2	māo.	chāō.	us.
3	rāi.	ping.	fino-je.	3	ci.	yin.	tōrru.
4	mūṇ.	ting.	fino-tō.	4	cen.	māo.	ov.
5	plek.	wu.	tsutsno-je.	5	cina.	shin.	tats.
6	kāt.	ke.	tsutsno-to.	6	mut.	sze.	mi
7	khut.	kang.	kauno-je.	7	cān.	wu.	uma.
8	ruṇ.	sin.	kauno-to.	8	rāo.	we.	tsitsuse.
9	tāo.	gin.	midsno-je.	9	mit.	shin.	sar.
10	kā.	kwei.	midsno-to.	10	kēō.	yeo.	torri.
				11	tyeō.	seo.	in.
				12	plāō.	hā.	y.

I have been unable up to the present to obtain any explanation of the origin of the Āhōm words used in these series.

The Chinese call the words in the first series *tien kan* or terrestrial signs, while those in the second series are the horary characters, and are known as *te che* or celestial signs. The first series in the Japanese system is made up of the elements, of which they reckon five, doubled by the addition of the masculine and feminine signs *je* and *to*; the second series is made up of the signs of the Zodiac.

The Āhōms commence their method of reckoning time from 568 A.D.,¹ so that, in order to ascertain the corresponding year *anno domini*, the number of *tāociṇas* should be multiplied by 60, the number of the year in the *tāociṇa* added and also 568.

Turning now to the coins, the year of the *tāociṇa* on the coin of Çuklenṇmuṇ is *plekṇi*, i.e., the 15th year; the number of the cycle is not mentioned, but as Çuklenṇmuṇ reigned from 1539 to 1552 A. D., we may assume that it was the 17th *tāociṇa*. Consequently the English date will be $16 \times 60 + 15 + 568 = 1543$ A.D. or the 4th year of Çuklenṇmuṇ's reign. The coins of Çupātphā were minted in *lākni rāiṇān*, or the 33rd year of the *tāociṇa*, and as Çupātphā's dates are 1681–1695 A.D. the cycle in question must be the 19th *tāociṇa*. The equivalent date in our Era will therefore be $18 \times 60 + 33 + 568$ or 1681 A.D., that is to say the first year of Çupātphā's reign.

Proceeding in the same way, the *lākni kātkeō* on the coin of Pramata Siṇha corresponds to 1744 A.D., which is the first year of that monarch's reign.

¹ This is the year in which Khunlung and Khunlai, the reputed progenitors of the Āhōm royal family, descended from heaven by a golden chain. Cukāphā is said to have entered Assam in the first year of the twelfth *tāociṇa* or 1228 A.D.

The dates of the Āhōm kings is a subject which must be reserved for discussion on some future occasion, when the old burañjis have all been translated, and other sources of information have been examined.

[Note.—The system of numbering years mentioned by Mr. Gait obtains also amongst other Eastern nations. For instance the following are the series of the Mongols and Tibetans, taken from Huc's *Travels in Tartary, Tibet, and China*, Vol. II. pp. 212 and ff. The signs of the denary series are expressed by the names of the five elements repeated twice, or by the names of the five colours with their shades. The names of twelve animals denote the duodenary series.

DENARY SERIES.

<i>Mongol.</i>	<i>Tibetan.</i>	
1 Mod	S'in	Wood.
2 Mod	S'in	Wood.
3 Kal	Me	Fire.
4 Kal	Me	Fire.
5 S'o-ra	Sa	Earth.
6 S'o-ra	Sa	Earth.
7 T'u-led	lC'ags	Iron.
8 T'u-led	lC'ags	Iron.
9 O-su	Ch'u	Water.
10 O-su	Ch'u	Water.

DUODENARY SERIES.

<i>Mongol.</i>	<i>Tibetan.</i>	
1 Hul-kan	Byi-ba (pron. 'Chi-wa)	Mouse.
2 U-kher	gLang	Ox.
3 Par	sTag	Tiger.
4 T'us-las	Yo-s	Hare.
5 Lwu	'bRug	Dragon.
6 Mo-kas	sbRul	Serpent.
7 Mo-ri	rTa	Horse.
8 Ho-ni	lC'ag	Ram.
9 Pe-ch'i	spRon	Monkey.
10 T'a-ka	Bya (pron. Cha)	Fowl.
11 No-has	Kyi	Dog.
12 Ka-has	P'ag	Pig.

The Tibetans do not compound these so as to form a sixty year cycle, but so as to form a cycle of 252 years. The twelve first years merely bear the names of the twelve animals. Then these same names are combined with those of the five elements each repeated twice up to the seventy-second year of the cycle. They then add to these combinations the word *po* (male), which carries them up to the 132nd years: then the word *mo* (female), which takes it up to the 192nd year. Finally they alternate the words *po* and *mo* up to the end of the cycle. A fuller account of the Tibetan system will be found in Csoma de Körös' *Tibetan grammar*, pp. 147 and ff. See also Dr. Waddell's *Buddhism of Tibet*, pp. 451 ff. I am indebted to Dr. Waddell for very kindly correcting the spelling of the Mongolian and Tibetan words.—*Ed.*]

Rough notes on the Grammar of the Language spoken in the Western Pañjāb.—By the REV. TREVOR BOMFORD, M.A., C.M.S., MULTAN.

These notes have been put together from the following **sources**:—

1. “Glossary of the Multan language” and proverbs of that language by the late E. O’Brien, Esq., for many years Deputy Commissioner in the Muzaffargarh and Multān districts.

2. Notes on the grammar of the Multānī language in MS., by the same, given by him to me when he left Multan in 1885.

3. “A grammar of the Multān language,” by the late Sir R. F. Burton.

This is advertised at the end of Edwardes’ “Year on the Panjab Frontier,” published in 1850; but Mr. O’Brien told me he had never seen it. All efforts I ever made to find it were failures, till at last I wrote to Sir R. F. Burton to ask him where I could get a copy. In reply he sent me two post cards (written about a week before his death). In the first of these he said that he had never completed the book but that his rough notes were published in the *Transactions* of the Bombay Asiatic Society; and in the second he said that he had studied the language because he was convinced that the European gypsies originally came from the South of the Pañjāb, and he added that his study of the language had confirmed him in this idea.

4. Translation of the New Testament into the Multan language, by the Serampore Missionaries, 1819.

5. Various translations into ‘Dērā-wāl,’ i. e. the language spoken near Dērā Ghāzī Khān, by Dr. Jukes, Church Missionary Society.

6. Various stories and proverbs.

7. Tisdall’s ‘Simplified Pañjābī Grammar.’

The language is known by various **names**.

1. Multānī. This is not suitable because it is spoken in many places far removed from Multān :

near Gurgāw, for instance, in the Dehli district, I have been informed that it is spoken by one tribe ;

and the language of the majority of the people in the Hazārā district is practically the same, though with many local differences.

A Multānī Jaṭ who was with me in the Hazārā in 1893, was delighted at finding himself understood by the people there when he spoke his own dialect.

2. Jaṭkī. This is not a good name because there are tens of thousands of Jaṭs who do not speak it. This is the name used in the Census Report of 1881.

3. Western Pañjābī (or Lahindī) the name used in Tisdall's Simplified Pañjābī Grammar.

4. Uccī (also spelt Ocikī or Wucī.) This is one name used in the Serampore translation of the New Testament and it is derived from Uc the name of an old and important town in the Bahāwulpur State which was once (probably) the capital of a large district. This name is still given to one version of the characters used by the Banyās of the South Pañjāb for writing their accounts.

5. Hindikī. The name given in the Census report of 1881 to the language spoken by the majority of the people in the Hazara.

The language is spoken in :—

1. The Native State of Bahāwulpur.
2. The district of Multān.
3. „ „ Muzaffargarh.
4. The Derajat, including both Dērā Ghāzī Khān and Dērā Ishmāil Khān, and extends into some of the vallies beyond the Sulaimān range.
5. The Hazārā district certainly on the Kashmīr side from Hasan Abdal up (at all events) to the Khagan range.
6. Probably in the northern parts of the Doab lying between the Jhelum and the Indus, but I have no information from those parts or from the Salt Range.

There are, of course, many local differences over such an extent of country, and words are in some parts borrowed from neighbouring languages which are unknown in other parts.

Thus, in the South of the Bahāwulpur State, words are naturally borrowed from Sindhī.

In the Derajat there is an admixture of Balūcī and Pashtu.

Towards the East the language is lost in Pañjābī which, however, here and there retains words and grammatical inflections which belong to the older language.

In travelling from Multān towards Lahore one very soon passes away from Western Punjabi; but if one continues one's journey north-

wards from Lahore, it is again met with about Rāwal Piṇḍī and from there onwards.

Note 1. Sir R. F. Burton writes :

- | | |
|---|---|
| { | <p>a. In the country parts of the South Pañjāb the people use the Jaṭkī dialect, which in the North-Western Pañjāb abounds in words borrowed from Pashtu or Dōgrī.</p> <p>b. Jaṭs are divided into—</p> <ol style="list-style-type: none"> 1. Pañjābī Jaṭs. 2. Hazārā Jaṭs. |
|---|---|

Note 2. Extract from Census Report of 1881.

		Population.		Jaṭkī Speaking.
Multān District	...	551,000	...	375,000
Muzaffargarh	...	346,000	...	331,000
Ḍērā Ghāzī Khān	...	363,000	...	324,000
„ Ishmāil „	...	441,000	...	90,000
Jhang	...	395,000	...	86
Montgomery	...	426,000	...	119
Native States	...	550,000	...	492,000
Hazārā	...	407,000	...	362,000
				1,974,205

It is impossible from the Report to make out how many of the inhabitants of Shāhpur, Jhelum, Rāwal Piṇḍī and Peshāwar habitually speak Western Pañjābī, but probably nearly another million should be added to the total.

It will be seen from the above that the language is strongest in the Muzaffargarh and Ḍērā Ghāzī districts and in the Native State of Bahāwulpur, which has a population of 500,000 of whom 492,000 speak it. It is probably purest in the Muzaffargarh district, for there it comes in contact with no other language.

Regarding the Census of 1891, see Appendix II.

The principal differences between Western Pañjābī and Pañjābī proper are to be found :—

1. In the formation of the future. This is always made in Western Pañjābī with an 's' instead of a 'g' as in Urdū.

The 's' it is true lingers all over the Pañjāb and maintains a feeble struggle against the more modern form, but in the West of the Pañjāb it holds undisputed sway.

It is probably the oldest way of all of forming the future from the root of the verb, but has almost everywhere given place to other ways.

In India it is found in Western Pañjābī and in Gujarātī, though curiously enough it has quite disappeared from the intermediate language of Sindh. It frequently occurs in the Sikh Granth¹ and is the regular form in Marwāri.

2. In the use of pronominal suffixes. These too are sparsely found in Pañjābī proper.

They are very common in Western Pañjābī, but less so than in Sindhī where they are very much used, and extend into Kashmīr, where their use is very wide.

3. In the continued existence of a Passive Voice or rather the relics of one. Sindhī, Gujarātī, and old Hindī still retain a Passive.

4. In the greater frequency with which some old Sanskrit letters are found which are quite lost in Urdū and almost so in Pañjābī.

5. The pronunciation is (certainly Multān way) far more nasal.

6. The words too differ very much. Dr. Jukes of Dērā Ghāzī Khān is compiling a dictionary of Western Pañjābī.

These notes on the grammar of this old language have been put together not as a final and infallible work on the subject, but with the view of collecting from others, better acquainted with it and its neighbouring languages than the writer, any further information either in the shape of corrections or additions that they can give him.

It is hoped that any one, into whose hands a copy of these notes may fall, will kindly point out to the writer any mistakes he may have made, and also supply any additional information he can on the extent or grammar of this language.

The Alphabet, &c.

Not much need be said here on this subject.

There are two ways in which the language may be written.

1. In the ordinary Persian character.

The objection to this is that there are not enough letters in the Persian alphabet to express all the letters of Western Pañjābī. This difficulty may be met (as with Sindhī) by introducing a number of additional marks to distinguish one letter from another, but these would only be useful to those specially instructed in their use. It is simpler to use the well-known letters and to leave it to those who know the language to make the necessary modifications in pronunciation. One may add that the number of those who can read or write this character is exceedingly small, and all who can do so know also Urdū, and if they want to write anything, write it in that language.

¹ Trumpp's Trans. cxxvi.

2. The Banyā characters. It was in these that the Serampore Missionaries printed the New Testament in 1819. They used 35 different symbols which have been described as belonging to the Asōka or Indo-Bactrian group of alphabets. Their translator and scribe was probably a native of the Bahāwulpur state—possibly from the town of Uc, for they generally speak of the language as Ucī. Since those days the shape of the letters (as written by the Banyās) has altered considerably and some have died out. In Multān itself there are now some 30 symbols in use.

The objection to these characters is—

(1.) The great variety of them which exist. In and about Multān itself there are three principal styles in which these characters are written, *viz.*, (a) the Multān style proper, (b) the Karōrī or style used in and about Karōr, a very old but small town in the Multān district, (c) the Uc style, but probably minor varieties might be found every twenty miles or so.

(2.) As no vowels are written it is very difficult for any one not acquainted with the subject matter to make out the meaning of any writing.

Note.—One of the letters may best be expressed in Roman letters by “nr” pronounced rather nasally. It is very common and is the termination of the infinitive as “ākhaṇ to say.” I mention it here because in an essay I once read on the language of the European gypsies, the writer argued that they must have come from the neighbourhood of Hunza because this sound was very frequent in the language of the people of those parts. It is represented in this paper by ‘ṇ,’ in Persian by نر

The Declension of Nouns.

a. The Genitive. This is used as in Urdū, but instead of kâ, kē and kī, Western Pañjābī uses.—

دا dā, before a noun in Nom. Sing. Masc.

دے dē, before any other masculine noun.

دی dī, before any feminine noun in the Singular.

دیاں diyyā, before any feminine noun in the Plural.

Example:—‘Daryā dā hamsāyā na bhukhā na trihayā,’

The neighbour of a river (*i. e.* the man who lives near a river) is neither hungry nor thirsty.

‘Yār dī yārī mai kũ bhun piyārī,’

The friendship of my friend is very dear to me.

Notes.—1. In the Serampore New Testament we have an interesting survival in connection with this “dā,” etc.

In modern use they are put after the noun just as *kā*, *kē*, *kī* are used in Urdū, but in that translation the suffix is always united with the preceding noun by an “h”—As no vowels are written, only the letters “hd” appear, which stand for ‘-ah dā,’ ‘-ah dī,’ etc., according to circumstances—

घरहद मलक } = gharah dā malik—or in modern style ghar dā mālik.
ghrhd mlk }

Note.—2. From Burton. In the South of the Multānī speaking districts we have for dā, etc., the Sindhī forms *jā*, *jē*, *jī*, *jiā*—although the last form is not found in Sindhī proper.

b. Dative Case.

کوں kũ } The former is the more common and is
کنیں kanē } equivalent to the Urdu “kō”
دو dū this is used after verbs of motion.

It is also written دیوں دھوں دوں; but see notes on the ablative.

Note.—Burton gives.

کوں kũ
تائیں tāī
(نوں) nū (nũ). This is the common dative suffix in Pañjābī,
but is not used in Western Pañjābī.

Examples.

(1) ‘Andhar piā sarkār kũ, jo cōr bādhē kōṭwāl kũ,’

Blindness has fallen on the Government, when the thief binds the watchman.

(2) ‘Pardēs dū gayā,’ He has gone to a foreign land.

c. The Accusative is like the Nominative without any postposition, or it uses the “kũ” of the Dative.

d. The Ablative is known by the ending ‘ō’ or ‘ũ,’ which is attached—

1. Directly to nouns as “shahr,” a city.
 “Shahrō,” from the city.

Examples.

‘Sunja khudāō dāḍha,’ The desolate is more powerful
 than God.

‘Hiki gālhō darda,’ Of one thing I am afraid.

2. To adverbs of place.

ithũ from here Jadũ thisī, from the time it will
uthũ „ there be.
kithũ „ where

3. To prepositions or postpositions.

‘Shahr vic,’ in the city, ‘Shahr vicō,’ from (in) the city.
‘Pahār utē,’ on the hill, ‘Pahār utō,’ from (on) the hill.

and most commonly to the dative postposition 'kanē' which becomes kanū.

ex. 'Bēkār kanū vigār cangē,' forced employment is better than no employment.

In this shape it becomes a very common ablative suffix.

When so attached, it, in most cases, where the first syllable is short, doubles the preceding consonant. This is certainly the rule in the Dērā Ghāzī District where we find kannū, uttō, tallū ('talē' under), aggū, viccū, &c.

4. Occasionally we find an ablative postposition 'thū;' ex., 'Chalā sā thū piā mangīndā.' The ring is being asked from us.

Here 'sā' is a contraction for 'assā' (see personal pronouns), and 'thū' is really a contraction for 'ithū' (see above).

Note 1.—Burton on the subject of ablative postpositions is vague, and gives 'an' 'on' 'te' 'ten' 'ton' 'thon' 'thin' 'siti' 'kanun' "kanān" "udon."—Most of these are modifications of postpositions with 'ū,' but some are quite unknown to me.

Note 2.—On the common use of such forms as kōlhū, uttū, &c.

There can be no doubt that these are originally ablative forms and that the termination 'ū' had the meaning 'from':

thus, 'mēḍē kōl,' with me, 'mēḍē kōlhū,' from (with) me

'pahār utē,' on a hill, 'pahār uttū,' from (on) the hill,

and many good scholars contend that this can be their only meaning. Thus Mr. Perkins writes "for Pañjābī the only meaning of kōlū is 'pās sē' and we could not use such a phrase as 'mēḍē kōlhū baiṭh,' for 'sit near me,' but only 'mēḍē kōl baiṭh.' The suffix 'ō' or 'ū' means 'from' and nothing else.

But on the other hand many good scholars of Western Pañjābī (both Natives and Europeans) say that if ever the suffix had the meaning of 'from' in such combinations as 'kōlhū' 'dhū' (for the 'h' in these see Note 3), it has quite lost it and has acquired instead an intensitive meaning thus:

'Mēḍē kōl baiṭh,' sit near me, 'mēḍē kōlhū baiṭh,' sit very near me.

Mr. E. O. Brien wrote from Dharmśālā on this point "I think 'kōlhū' and 'piccū' are right in such phrases as 'ō undē kōlhū kharā hē' and in 'mēḍē piccū ā.' This use of an adverb of place with an apparently ablative suffix but without the meaning 'from' is found in other dialects. If I ask a hill man (in Kangra) where he is going he often says 'uparō,' meaning 'up'—Trumpp gives more than one adverb of place ending in 'ō' without a meaning of 'from' in it.¹

¹ [The ō is no doubt derived from an older hū or hu. This word, hū or hu has two distinct meanings throughout Northern India. It may either be the ter-

Note 3.—This ablative ending—is found,

1. In Marāṭhī in the form ‘ūn’ or ‘hūn.’ The presence of the ‘h’ in this case accounts for its presence in ‘kōlhū,’ ‘ahū,’ as used in Western Pañjābī, and also for the doubling of the consonant in cases when the ‘h’ is not found—the additional consonant representing the lost ‘h’

2. In Sindhī.

3. Very commonly in Pañjābī as ‘gharō,’ from the house, ‘jānō mārṇā,’ to kill from life.

4. It is found in Urdū as in ‘bhūkhō mārṇā,’ to die from hunger.

1. *The Instrumental Case* is either the same as the Nominative or as that form of the noun which takes the other postpositions (and which is called the Formative).

In Urdū it is always followed by the post position ‘nē’ (when the verb is transitive, as ‘mañ nē farmāyā’), but authorities are divided as to the use of the post-fix in Multānī, some saying that ‘mañ farmāyā’ is sufficient.

The ‘nē’ is always used in the Serampore New Testament and by many natives of Multān itself, but is rarely heard in the Muzaffargarh or Dērā Ghāzī Khān districts or in the Bahāwalpur state.¹

e. Nouns *masculine* ending in a Consonant make no change in the Singular when post-fixes are added, but to form the plural they add اں ã (in the nominative) یں ē (to the formative), and و ō (to the vocative).

Ex. Sing. Nom., Form., and Voc. ڈانڈ dānd a bullock

„ Plur. Nom. ڈانڈاں dāndã bullocks

Form. ڈانڈی dāndē

Voc. ڈانڈو dāndō

2. Nouns *feminine* ending in a Consonant make no change in the Singular, but, for the Plur. Nom., add اں ã, for the Formative یں ē; and, for the Vocative و ‘ō.’

Ex. Sing. Nom. Form. and Voc. پہاچ pahāj, a rival wife.

„ Plur. Nom. pahājã, Form. puhājī, Voc. pahājō.

3. Nouns *masculine* in ء ā substitute ے ē for the formative singular, یں ē for the Nom. Plural, یں iyã for the Formative, and یو iyō for the Vocative.

Ex. Sing. Nom. بندہ banda a servant

„ „ Form. بندے bandē

„ „ Voc. بندہ banda.

Plur. Nom. بندیں bandē

„ Form. باندیاں bandiyã

„ Voc. بندیو bandiyō.

mination of the Apabhraṃṣa Prakrit Ablative, or a particle of emphasis, a variety of the Prakrit *khu*, and Sanskrit *khalu* (Hēma-candra, ii, 198). *Ed.*]

¹ All these rules are uncertain, for they vary much in different parts. They are given here as I found them in Mr. O’Brien’s MS. Notes.

3. with adverbs as 'pērō' for pēr.'

'watō' — wat.'

4. with verbs, as 'paisīnō' for 'paisīn.'

Adjectives. Declension of:—

— when with a noun masculine in Sing. Nom. they add اے ā to the root.

— with a noun masculine in any other case sing. or plur. they add یں ē

— with a noun feminine singular they add ین ī

— „ „ „ plural „ „ یاں iyā

Ex. Masc. Sing; Nom. cangā, good.

any other case, cangē.

Fem Sing. cangī, Plur. cangiyā.

Note.—Adjectives, without substantives, sometimes coalesce with the substantive verb.

as 'cangē,' it is good, for 'cangā hē.'

'cangin,' they are good, for 'cangē hin.'

and 'kharō,' stand, for 'kharē hō.'

Comparatives and Superlatives are made much as in Urdū.

Example. Comparative.

Maī ū kanū bhū cangā hā,

I am better than he.

Maī sabhñē kanū cangā hā,

I am better than all, i.e., I am best of all.

Numerals.

1	هک	hik	18	آٹھارہاں	āṭhārḥā
2	دو or ڈو	dū or ḍū	19	انویہ	ūnvīh
3	ترے	trai	20	ویہ	vīh
4	چار	cār	21	اکویہ	ikvīh
5	پنج	panj	22	باروی	bāvī
6	چھی	chī	30	تریہ	trīh
7	ست	sat	31	اکتری	ikattrī
8	آٹھ	aṭh	32	بتری	battrī
9	نوں	nō	40	چالھی	cālhī
10	دہا	ḍāh	41	اکتالھی	iktālhi
11	یارہاں	yārḥā	42	بتالھی	bitālhi
12	بارہاں	bārḥā	50	پنجاہ	panjāh
13	تیرہاں	tērḥā	51	کونجاہ	ikwanjāh
14	چوڈہاں	codḥā	52	بونجاہ	bawanjāh
15	پندرہاں	pandrḥā	60	سدہ	saṭh
16	سولہاں	solḥā	61	اکانڈھ	ikāiṭh
17	ستارہاں	satārḥā	62	بائڈھ	bāiṭh

70	ساتر	sattar	82	بیاسی	biyāsi
71	اکھتر	ikhattar	90	نوں	nawwē
72	بہتر	bāhattar	91	اکانوں	ikānwē
80	اسی	assī	92	بیانوں	biyānwē
81	اکاسی	ikāsi	100	سو	sau
first	پہلا	pahlā	seventh	ستواں	satwā
second	دوہا	dūjhā	eighth	اتھواں	aṭhwā
third	تیرہا	trijhā	ninth	ناواں	nāwā
fourth	چوتھا	chauthā	tenth	دہواں	dāhwā
fifth	پنجواں	panjwā	eleventh	یارھواں	yārhwā
sixth	چھیواں	chiwā	twelfth	بارھواں	bārhwā
&c.					

Personal Pronouns.

	Singular.	Plural.
1st person Nom.	میں māi	اساں assā
Genitive	میںدا mēdā, with noun M, in sing. nom.	اساںدا assādā
	میںدے mēdē, with any other noun M.	اساںدے assādē
	میںدی mēdī, with a noun F. sing.	اساںدی assādī
	میںدیاں mēdiyā, with any noun in Plural.	اساںدیاں assādiyā
Dative	میں کوں māi kũ	اساں کوں assā kũ
or	میں کوں maikũ	or اساں کوں assākũ
Accusative same as Dative.		
Ablative	میں کنوں māi kanũ	اساں کنوں assā kanũ
or	میں کنوں maikanũ	or اساں کنوں assākanũ.

Note.—The first syllable in the plural may be dropped before a post position or a word of one syllable.

Ex. 'assā pardēsī, sā dī zāt matōhī,' We are strangers ; our caste is Matōhī.

'Trut gāi yārī sā kũ,' Our friendship is broken.

	Singular.	Plural.
2nd person Nom.	تو tũ	تساں tussā
Genitive	تویدا tēdā &c.	تساںدا tussādā, &c.
Dative	تو کوں tāi kũ	تساں کوں tussā kũ
	تو کوں taikũ	تساں کوں tussākũ
Accusative same as Dative.		
Ablative	تو کنوں tāi kanũ	تساں کنوں tussā kanũ
or	تو کنوں taikanũ	or تساں کنوں tussākanũ.

Note. — For tussādā, &c., we occasionally find the common Pañjābī form of tuhādā, or tu'ādā, &c.

2. The hard 'd' in the Genitive is also found in Pañjābī.

3. In the Serampore Translation in the instrumental cases of the plural we sometimes find assād and tussād, as if these were the roots.

3rd person. The special forms for this have been lost except in the case of suffixes. In its stead is used the Demonstrative Pronoun.

Note. — In the story of the Four Fools it is usual to place the Pronoun after the noun it agrees with, and not before it as is usually done.

Ex. 'mangēdī mēdī kū piō ũ dā ākhiā,' instead of 'mēdī mangēdī kū ũ dā piō ākhiā,' Her father said to my betrothed.

Pronominal Affixes.

In Sindhī, pronouns are affixed in fragmentary forms to nouns and verbs; and sometimes more than one, *viz.*, one to represent the Agent and one the Object.

In Western Pañjābī the use of these affixes is almost lost so far as nouns are concerned (though E. O'Brien says they are found with nouns, verbs, and adverbs), and they are found principally with—

1. The past participles of verbs.
2. Some other parts of verbs.
3. the Negative.

They are, of course, fragments of fuller forms and are as follows:—

Sing.	1st pers.	'm' ²	as	kitum	I did
	2nd pers.	'ī' or 'ēī'	,,	kitēi	thou didst
	3rd	's'	,,	kitus	he did
Plur.	1st	'sē'	,,	kitōsē	we did
	2nd	'ō' or 'vē'	,,	kitōvē	you did
	3rd	'~hē' ¹	,,	kitōhē	they did.

Note 1. Burton gives them slightly different, and omits those for first and second plural. They are written above as given by E. O'Brien, but I think that in one point a correction is needed. He gives 'ō' as the suffix for the 2nd pers. plur., but in every case that I have come across it, it stands for 2nd pers. singular with Intransitive verbs.

As the use of these suffixes is one of the most interesting things in Western Pañjābī, very full examples will be given.

¹ Sometimes written *nī*, *e.g.* 'Jaḍaṇ ũ dā ma'lūm thīdōni, When the knowledge of it came to them; so also *khāsōni*, He will eat them.

² A form of the first person with 's' is found with Intransitive verbs.

1. They are found with the *Past Participles of Verbs*, forming in this way regularly conjugated tenses.

a. with intransitive verbs they hold the place of a nominative as
'āyōsē,' we came = assā āē.

Sometimes the pronoun appears as well as the suffix as in 'ḍrukiōsē assā,' we ran. This is done for emphasis or through forgetfulness of the meaning of the suffix.

b. With transitive verbs they hold the place of the Agent. Thus 'ākhiōhē' equals 'ākhiā ūhē,' It was said by them.

Examples —

1st. pers. sing. 'jutam jōra, pānri lāyam,' I yoked the pair, I laid on water.

2nd „ „ 'āpnī bēri bōr dītēi,' You swamped your own boat.

„ „ plur. 'āp na āyō, paṭh dītō kunwar kũ,' You did not come yourself, you sent the girl.

3rd „ sing. 'jō kujh bhānus, sō kujh kitus,' Whatever he wished, that he did.

„ „ plur. 'mēḍā yār parniōhē,' They have married my friend.

2. They are found, representing various cases of the pronouns, attached to other parts of the verb, as well as with the participle.

1st Sing. 'Ishk tēḍē dī gālpiyum gārī,' The snare of thy love has fallen to me on my neck. *piyum* = *piyī-m*.

'Rōndē rōndē bhōchar thium jhabārum,' Weeping, weeping my sheet became wet.

'Nazar āwim matān,' Perhaps he may appear to me — *āwim* = *āwē-m*; and the sentence is equivalent to *matān mēḍī nazar vic āwē*.

'Visar na vaisim.' I will not forget, literally forgetfulness shall not be by me.

2nd Sing. 'Sahibān mutei khatt' Sahiban has sent to thee a letter.

'Kai powini dalilān' May some excuses occur to thee.

'Allāh na ānēi'¹ May God not bring to thee.

'Kai sikhlāē' Who taught thee.

'Tars na ayō' Did not pity come to thee.

'Marini samjhēndē' May die thy advisers.

'Jhugē kũ bhā lēndiā' To thy hut I may set fire.

'Hath bhan-ghatsāz' Thy hand I will break.

'Hik gālh ākhāz' Let me say one word to thee.

¹ When the affix of 2nd person sing. represents a dative it takes as above the form *i*. This is lengthened into *ā* after the 3rd Pers. Sing. Future, as 'Hik dalil āsīā,' An excuse will occur to you.

In these last three examples the pronoun has become imbedded in the verb. Lēndiā and ākhāi are for lēndā and ākhā the first pers. sing. conditional; ghatsāi is for ghatsā the 1st pers. future.

3rd Sing. 'Bhājar bōṛ dītus' The flood carried away *his* threshing floor.

'Sabhō kam farēb dā *his*' All *his* deeds savour of deceit.

'Pichā pittal dā *His* hinder part is of brass.
hōndis'

'Ciṭ kar diti *his*' He made a plain of it 's' here is agent

'Jind diti *his*' He has given life ———

'Kitus mōṭā' He has made *it* fat ——— accusa-
tive

'Mārius yār' A friend beat *her* ———

'Tū pitēs sir kanū' You may lament *him*
from the head ———

'Bukhār *his*' Fever is to *him* ——— Dative

'Sangatī milius' A friend met *him* ———

'Wanjan dēōs' Let *him* go ———

1st Plur. 'Mēdhiāwālī dā khiāl piōsē.' A fancy for the girl with the braids occurred to us—pi ōsē.

3rd. Plural.

'Yād āyōhē.' Remembrance came to them—

Examples are also found of a double affix.

as kitum I did *it*.

kitiumis I did it to *him*.

saṭṭius *he* threw.

saṭṭionis *he* threw *them*.

3. Some of them are found combined with the negative.

1st. Person sing. nimhē. Here, as in the case of the 2nd person sing., we find the pronoun in the middle of the negative.

Ex. 'pānjhā nimhē mangdā,' I do not ask a handful.

This 'nimhē' is of frequent occurrence, and the common people have so far forgotten its meaning, that they almost invariably use the 1st pers. pron. 'maī' with it. Thus, they would generally say 'maī pānjhā nimhē mangdā,' but they have so far remembered its meaning that they never use 'nimhē' with any other person than the 1st singular.

2nd person singular 'nivi.'

1st person plural 'nisē.'

2nd person plural 'nivē' or 'nivhē.'

Ex. 'Kam nivhē karēndē—nisē karēndē'

Are you not working?—We are not working.

'Tēdī adālat nisē calndē,' We do not want your judgment.

4. With nouns and adverbs.—So says E. O'Brien, but I have not yet found any examples unless kharum 'I was standing' may be reckoned as one, but kharā is almost a participle and its root is in West Pañjābī still used as a verb. One may hear 'Hik pāssē kharō,' Stand on one side.

N.B.—I can find no instances of these pronominal suffixes in the Serampore New Testament, which is strange, as that translation was made 70 years ago when, one would have thought, old forms would have been more common than at the present day, and the translator was from the Bahāwulpur State where, from its proximity to Sindh, one would expect to find them in full force.

Demonstrative Pronouns.

1. a. Near Demonstrative b. Emphatic Near Demonstrative.

Sing. Nom. { ای ī, this.
ایہ ēh

Formative ایں ī

Plur. Nom. { ای ī
ایہا ihē

„ Form { انہا inhā or
انہیں inhē

ایہو ihō, this very.

fem. ایہا ihā

ایہیں ihī

ایہے ihē

انہایں inhāē

The Accusative has the forms of the Dative or Nominative. An occasional variation is 'hī' or rarely 'thī' for 'ī.'

c. Remote Demonstrative.

used as 3rd Personal Pronoun. d. Emphatic Remote Demonstrative.

Sing. Nom. او ō or ū, that.

or اوہ ūh

Form. اوں ū

Plur. Nom. { او ū or ō
اوہ ūh
اوہے ūhē

„ Form. انہا unhā

or انہیں unhē

اوہو ūhō, that very.

fem. اوہا ūhā

or { اوہیں ūhē
ہوئی hūī
اوہے ūhē

انہاں unhāē

Relative Pronouns.

a. Sing. Nom. جو jō

„ Form. جیں jāī

Plur. Nom.

„ Form.

or

جو jō

جنہا jinhā

جنہیں jinhē.

- b. Sing. Nom. m. جیرھا jērḥā Plur. Nom. Masc. جیرھے jērḥē
 „ „ f. جیرھی jērḥī. „ „ Fem. جیرھیاں jērḥiāṁ
 „ Form. جیرھے jērḥē

Correlative Pronoun.

Sing. Nom. سو sō	Plur. Nom. سو sō
Form. تیں taĩ	„ Form. { تنہاں tinhāṁ تنہیں tinhē.

Interrogative.

- a. Sing. Nom. کوں kaũ, who? Plur. Nom. کوں kaũ or
 کيھا kīhā
 Form. کیں kaĩ Form. کنہاں kinhāṁ
 or کنہیں kinhē

b. Indeclinable چه ce ‘what?’

c. Declinable کیرھا kērḥā, declined as جیرھا jērḥā.

d. Sing. Nom. کہاں kihāṁ, which?
 Sing. Form کہیں or کہی kahĩ or kahī

e. Neut. کیا kiya.

Indefinite (a) Sing. Nom. کوی kōī, any one. Plur. Nom. کوی kōī (?)
 do. Fem. کای kāī or کئی kaī
 „ Form. کہیں kahĩ „ Form. کنہاں kinhāṁ
 (b.) کچھ kujh, anything.

Reflexive Pronoun.

a. آپ āp, declined regularly, but also possessed of two irregular forms, viz.

آپیں āpē, of, or from, or by one self. Ex., ‘Ap āpē kam karō,’ do the work yourself.

آپت apat, always used with the postposition ‘vic’ as ‘apat vic,’ amongst ourselves, yourselves, or themselves.

b. a form of Genitive regularly declined as an adjective.

آپنوں āpnāṁ
 آپنوں āpnē
 آپنوں āpnī } used as a possessive pronoun.
 fem. plur. آپنوں apnyāṁ.

Pronominal Adjective.

Sing. Nom. سبھ sabh, all—occasionally (but not in Dērā Ghāzī)
 ہب hab.

Plur. Nom. سبھے sabhē, occasionally سبھے habhē
 „ Form. سبھناں sabhnāṁ or سبھنیں sabhnē.

or سبہنڑاں sabhṇṛāṅ or سبہنڑی sabhṇṛē
or سبہنڑایں sabhṇṛāṅ

Correlative Pronominal Adjectives.

- a. Those expressing *quantity* are formed by adding 'lā' to the root as, itlā, this much ; utlā, that much ; jitlā, as much ; titlā, so much ; kitlā (or kittā), how much ?
Ex. 'Jitlē lōk ū kũ cutā, titlē cangē thīē,' As many people as touched him, so many were healed.
- b. Those expressing *size* add 'dā' as, ēdā, this size ; jēdā, as big kēdā, how big ?
- c. Those expressing *quality* or *kind* add 'hā' or more fully jihā or jihāṅ ; as, ijihāṅ, of this kind ; ujihāṅ, of that kind ; jejihāṅ, of which kind ; kijihāṅ, of what kind ; ihōjihāṅ, of this very kind.
- d. Those expressing *direction* add dē or dō to the root ; as ēdē, this way ; ūdē, that way ; kēdē, which way ? ; jēdē, in which way ; ēdō from this way ; ūdō, from that way ; jēdō, from which way ; kēdō, from which way ?

N. B.—The 'ō' in these latter forms is the ablative ending 'ū' or 'ō'

THE VERB.

The Verb Substantive.

This in W. Pañjābī has two forms, *viz.*, 'hōwaṇ' and 'thīwaṇ,' to be. Of these the latter is a Sindhī form, and is hardly known in true Pañjābī. Towards Multān it is almost more common than the other, but is rarer towards the North though occasionally heard in the Hazārā.

(1) Infinitive.

هونتر hōwaṇ to be or become تھیونتر thīwaṇ.

(2) Present Participle.

هوندا hōndā, &c., being or becoming تھیندا thīndā, &c.

(3) Past Participle.

هویا hōyā, &c., been or become تھیا thīā, &c.

(4) Conjunctive Particles.

هوکے hō kar	} being	تھیکر thī kar
هوکراہیں hō karāhī		تھیکراہیں thī karāhī.
هوکے hō kē		تھیکے thī kē.

(a) Note. The ending 'karāhī' is very common towards Dērā Ghāzī Khān, but is not so common elsewhere.

(b) Burton gives the following particles ‘hō, hōē, hōni, hōkē, hōkar, hōkarē, hōkarā, hōkarkē.’ The last is still very common in Bahāwulpur.

(5) *Simple Potential.*

I may be, &c.

میں ہوں	maĩ hōwā	1st Sing.	میں تھیوں	maĩ thīwā
تو ہوں	tũ hōwē	2nd „	تو تھیوں	tũ thīwē
او ہوں	ō hōwē	3rd „	او تھیوں	ō thīwē
استای ہوں	assā hōwũ	1st Plur.	اشاں تھیوں	assā thīwũ
تساں ہوں	tussā hōwō	2nd „	تساں تھیوں	tussā thīwō
اھے ہوں	uhē hōwin	3rd „	اھے تھیوں	uhē thīwin.

Note.—Burton gives an alternative form without the central ‘w,’ and here, as elsewhere, does not notice that the 3rd pers. plur. ending is always, ‘in.’

(6) *Imperative.*

‘Be’

ہو	hō	2nd pers. sing.	تھی	thī
ہوؤ	hōwō	„ „ plur.	تھیؤ	thīwō

(7) *Indefinite Present.*

I am, &c.

ہاں	hā	1st pers. sing.	
ہیئیں	hai	} 2nd „ „	
practically	ہیں		
or	ہیں		
ہے	hē	3rd „ „	
ہیں	hai	1st „ plur.	
ہو	hō	2nd „ „	
ہن	hin	3rd „ „	

Note 1.—In the Serampore New Testament this tense is always written with an ā prefixed. This is in accordance with Sanskrit. Trumpp in his Sindhī grammar gives the following as an old Sanskrit present as now pronounced.

Sing. انہیاں āhiyā; 2nd انہیں āhē; 3rd اھے āhē.

Plur. انہیوں āhiyũ; 2nd انھیو āhiyō; 3rd انہیں or انھن āhīne or āhine.

See note on past tense, page 309.

The preliminary ‘ā’ is still occasionally found.

Note 2.—Burton gives ;—

Sing. 1. hā, ahā or ā; 2nd hai, hē, or ahē; 3rd hai, ahē or ē.

Plur. 1. hā, hāgē or ā; 2nd hō, hōhū, or ō; 3rd hai, hāvam or aĩ.

(8)

Definite Present.

I am being, &c.

ہونداں	hōndā	1st Pers. Sing.	تھینداں	thīndā.
ہوندی	hōndē	2nd „ „	تھیندیں	thīndē.
ہوندے	hōndē	3rd „ „	تھیندے	thīndē.
ہوندے ہیں	hōndē haī	1st „ Plur.		
ہوندے ہو	hōndē hō	2nd „ „		
ہوندن	hōndin	3rd „ „		

The forms for 1st, 2nd, 3rd, Sing. together with that for 3rd Plural are of course only contractions of the participle with the indefinite present, and this tense hardly deserves to reckon as a separate tense. In the Bahāwulpur State, the *d* is frequently omitted, and we have ہوناں hōnā, تھیناں thīnā, &c.

(9).

Indefinite Past.

I was, &c.

Is only the past participle in agreement, masculine or feminine, singular or plural, with the nominative, as:—

بادشاہ ہوا	bādshāh	hōyā	or thiā,	the king was.
مالکہ ہوئی	mālīka	hōī	or thiī,	the queen was.
فقیراں ہوئے	faqīrā	hōē	or thiē,	the faqirs were.
سہیلیاں ہواں	sahēliā	hōyā	or thiā,	the handmaids were.

Personal Pronouns are either expressed, as میں ہوا māī hōyā, I was, or joined on as suffixes, as:—

تھیئم thīum, I was
تھیوسے thīōse, we were

Ex., 'Vatan kanū bē vatan thīōsē,' We became without a country from our country, *i. e.*, we became strangers to our own country.

Definite Past.

(10).

I was

Root hā.

1st pers. sing.	ہم	ham	I was
2nd „ „	ھا	hā	thou wast
3rd „ „ m.	ھا	hā	he was
„ „ „ f.	ہاں	hāī	she was
1st „ plur.	ہاں	hāī	we were
2nd „ „	ہاں	hāī	you were
3rd „ „	ہاں	hāī	they were.

Some of these are very rare; the first plural is usually pronounced as written, but the 3rd plural is pronounced *han*.

If used with pronouns, they are either expressed separately or are attached as suffixes, as—

1st pers. sing.	ہاؤس	hāus or ہائِم	hāim	I was
2nd „ „	ہاویں	hāvē		thou wast
3rd „ „	ہاؤسی	hāus		he was
1st „ plur.	ہاوسے	hāsē		we were
2nd „ „	ہاوے	hāvē		you were
3rd „ „	ہائیں	hāē		they were.
	ہائیں	(fem.) hāī	_____	
	or ہانئیں	hāē	_____	
	or ہانہیں	hāhē	_____	

Notes. (1.) This is formed by adding personal affixes to a root *hā*.
Hāhē is for *hā ūhē*.

(2.) Hāus is sometimes found as the dative of the 3 Pers. affix, as ‘biyā ākhdā hāus (or hās’), Another was saying to him.

(3.) The 3rd Plural is found too with an affix of the 3rd Pers. Sing., ‘Manjhē mōl ghiddiā hāis,’ He had bought the buffaloes.
hāis for hāī-s.

(4.) Of these forms those for 2nd Sing., 1st Plur., and 2nd Plur. are constantly used in place of those given for the Definite Past thus

‘Kam harēndē hāvē,’ Were you doing the work
‘Karēndē hāsē,’ We were doing it.

(10a.) *Past*; almost obsolete form, though still occasionally met with. It is given by O’Brien and Tisdall, and is always used in the Serampore N. T.

اھم	aham	1st. Pers. Sing.
.....		2nd „ „
اھا	ahā m.	}
اھی	ahī f.	
.....		1st „ plur.
.....		2nd „ „
اھے	ahē m.	}
اھن	ahin f.	
اھیا	ahiyā f. (Tisdall)	
اھائی	ahāī f.	

Ex. ‘Khāni suṇdi āham,’ I had heard the story.

‘Bēgāniā trīmiā ūhē vēlhē tōrē ahāī,’ Strange women were till that time.

(11) *Imperfect.*

I was being, &c.

Compounded of present participle and past tense, as

میں ہوندا ہم *maĩ hōndā ham.*(12) *Perfect.*

I have been, &c.

Compounded of past participle with indefinite present, as

میں ہویا ہاں *maĩ hōyā hā*(13) *Pluperfect.*

I had been, &c.

Compounded of past participle with past tense, as

میں ہویا ہم *maĩ hōyā ham.*(14) *Future.*

The formation of the future is, as has been said before, one of the peculiarities of Western Pañjābī for as in Greek and Gujarātī it is done with 's'. The following endings are affixed to the root.

a. Intransitive verbs	1st sing. sã.	2nd sē	3rd sī
b. Transitive active	„ „ esã	„ esē	„ esī
c. ————— passive	„ „ isã	„ isē	„ isi
1st pl. sũ	2nd sō	3rd. sin	
„ „ esũ	„ esō	„ esin	
„ „ isũ	„ isō	„ isin	

Tisdall in his notes on Punjabi grammar gives the following tables. The future from the root 'kar' in the following languages ;

	Sing.	Sanskrit.	Prakrit.
1st	Pers.	Kariṣyāmi	Karissāmi
2nd	„	—iṣyasi	—issasi
3rd	„	—iṣyati	—issadi
	Plur.		
1st	Pers.	—iṣyāmas	—issamī
2nd	„	—iṣyatha	—issadha
3rd	„	—iṣyanti	—issanti
	Gujarātī.	West Pañjābī.	Correct West Pañjābī.
	Karís	Karsã	Karēsã
	—sē	—sī	—esē
	—sē	—sī	—esī
	Karísũ	—sã	—esũ
	—sō	—sō	—esō
	—se	—saṇ	—esin

Future of hōwaṇṛ and thīwaṇṛ

I will be.

هوساں	hōsā	1st Pers. Sing.	تھيساں	thīsā
هوسیں	hōsē	2nd „ „	تھيسیں	thīsē
هوسی	hōsī	3rd „ „	تھيسی	thīsī
هوسوں	hōsū	1st „ Plur.	تھيسوں	thīsū
هوسو	hōsō	2nd „ „	تھيسو	thīsō
هوسن	hōsin	3rd „ „	تھيسن	thīsīn.

The Intransitive Verb.

Example, √ ā or āw, Come.

(1) *Infinitive.*

آونتر āwaṇ, To come.

(2) *Present Participle.*

This in intransitive verbs is made by adding ‘dā’, but āwaṇ makes آندا āndā, because its root ends in a vowel.

(3) *Past Participle.*

آيا &c., āyā

{ for further notes on
participles see later
on.

Note. The past participle (of Intransitive verbs at all events) is frequently used as an indefinite past, as,

Druk druk muī tē pēkēn na Running, running,—she *died*—and
puni. did not *reach* her father’s house.

Sāt sau cūhē khā, billī haj After devouring 700 mice the cat
kū julī. has gone on pilgrimage.

(4) *Conjunctive Particles, Coming.*

(a) آي āī, a very common form in such stories as ‘The Four Fools’ where ī is used with ‘kē’ attached as uṭhī kē, rising.

(b) آ ā, the root of the verb. This is the commonest form of particles in proverbs. See ‘druk’ and ‘khā’ in the examples above.

(c) آکر ā kar, the common form in Urdū. Often in Western Pañjābī written āw kar.

(d) آکراہیں ā karāhē.—The most common form towards Dērā Ghāzī.

(e) آکے ā kē,—The common form in the Bahāwulpur State.

(5)

Imperative.

Come.

Sing. آ ā

Plur. آو āō

(6)

Potential.

May come.

Sing. 1.	آو āwā	Plur. 1.	آو or آو āū or āwū
„ 2.	آوی āwē	„ 2.	آو āwō
„ 3.	آو āwē	„ 3.	آو āwin

Note. — this is often used as —

(a) *Indefinite Present.*

‘Halkā bhāṇḍā bahū kharākē,’ An empty vessel makes a great noise.

(b) *Potential.*

‘Pāwē har kaī, thamkāwē kaī,’ Every woman wears anklets; some can make them tinkle.

(c) *Conditional.*

‘Jē zālim hōwē,’ If he be a tyrant.

7.

Present Definite.

I am coming.

This has two forms —

(a.) Compounded of the Present Participle and the Indefinite Present of the substantive verb,
as آندā hā āndā hā.

(b.) Compounded in same way, but with the components contracted into one word.

1st Sing.	آنداں āndā	āndā = āndā hā.
2nd „	آندی āndī	āndī = āndā hē.
3rd „	آندے āndē	āndē = āndā hē.
1st Plur.	آندے ہی āndē haī	(not contracted).
2nd „	آندیو āndiyō	āndiyō = āndē hō.
3rd „	آندن āndin	āndin = āndē hin.

Some students consider the latter form more indefinite.

Note.—Just as the present participle in this latter case contracts with the auxiliary verb to form a tense—so do adjectives, as

‘Jat tē phat badhā cangē.’ Cangē = canga hē.

A Jat, like a wound, is best when bound.

and adjectives are also contracted with the past tense. Thus in ‘The Four Fools’ we have,—

Kharām and kharus for kharā ham and kharā hāus, I was standing.

But kharā in W. Pañjābī is still used as a participle, and parts of the verb are still to be heard, as

‘Kērhē vēlhē kharīā,’¹ What a time I am standing.
‘Hik pāsē kharō,’ Stand on one side.

Note 2. In connection with these two forms of the present, Burton gives what he calls a present indefinite feminine (which however seems more connected with the potential), viz.,

1st Sing.	ākhāniā	1st Plur.	ākhāniyā.
2nd „	ākhāniē	2nd „	ākhāniyānō.
3rd „	ākhāniē	3rd „	ākhāniyā.

This is pronounced to be Pañjābī by some authorities.

7. *The Past (called by some the Aorist).*

This is merely the past participle in agreement with the nominative, as—

ایہو گماں ایا	ihō gumān	āyā,	this thought	came
ایہہ دلیل ائی	ēh dalil	āyī,	„ idea	„
فقیران اے	faqīrā	āyē,	the faqirs	„
سہیلیاں ایاں	sahēliā	āyā,	the handmaids	„

When a pronoun is the Nominative it is either expressed as—

میں ایا māī āyā, I came
اساں اے āssā āyē, we came

or is attached as a suffix, as—

1st pers. sing.	ایم	āyam or ایس āyus	I came
2nd „ „	ایو	āyō	thou camest
3rd „ „	ایس	āyus	he came
1st „ plur.	ایو سے	āyōsē	we came
2nd „ „	ایو وے	āyōvē	you came
3rd „ „	ایو نہی	āyōhē	they came

Other examples are, saggiam, I am able; piam, I fell; rihus, he remained; nikathōsē, we came out; giōvē, you went.

8. *The Imperfect.*

I was coming.

This is compounded of the Present Participle and the Past of the Verb Substantive, as

āndā ham (or hāus), I was coming.

¹ Kharīā is feminine for kharī hā.

9. *The Perfect.*

I had come.

This is compounded of the Past Participle with the Potential (Indefinite Present) of the Verb Substantive; as *ayā hā̃*, I have come.

N. B.—Sometimes the two parts are contracted into one form, as *āyā̃*, I have come.

Ex., *Fajr dē vēlhē gayā̃*. I went in the morning.

10. *Pluperfect.*

I had come.

This is compounded of the Past Participle with the Past tense of the Verb Substantive, *ās ayā ham*, or *āyā hāus*, I had come.

The Future.

I will come.

1st Sing.	آساں	āsā̃	1st Plur.	آسوں	āsū̃
2nd „	آسیں	āsē̃	2nd „	آسو	asō
3rd „	آسی	āsī.	3rd „	آسن	āsin.

It is common to find the almost obsolete root letter ‘w’ in the future, as ‘*awsī*’ he will come.

12. *Definite Future.*

I shall be coming.

This is compounded of the Present Participle and the Future of the Verb Substantive, as *āndā hōsā̃*.

13. *Past Future.*

“I shall have come.”

This is compounded of the Past Participle and the Future of the Verb Substantive, as *āyā hōsā̃*.

The Transitive Verb.

1. *Infinitive.*

مارنتر *māraṇ*, to beat, from root مار *mār*.

Note.—In Urdu the Infinitive is used as an Imperative with a sense of continuous action, or as an Intensive.

The same effect is produced in Western Pañjābī by adding آں to the root

e. g., *māraṇā̃*, you must beat—*vanjaṇā̃*, you must go, or ‘*dēwaṇā̃ kaī kũ hāus*,’ to whom must I give?

2. *Present Participle.*

beating.

These in Western Pañjābī add ‘ēndā,’ &c., and shorten the root, thus, **مربندا** marēndā.

3. *Past Participle.*

beaten.

ماريا māriā or **مارا** mārā.

Note.—Verbal nouns, according to Burton, are formed by adding andar or indar to the Root, as ākhandar, a speaker (karaṇ however makes kandar or kandal), or by adding ‘hār’ to the Infinitive as mangaṇhār, a beggar.

4. *Conjunctive Particles.*

beating.

مار mār	ماري māri	} See notes on particles of Intransitive verbs p. 311.
مارے mār kē	مارکراہیں mār karāhē	
مارکر mār kar		

5. *Imperative.*

beat.

2nd Sing. **مار** mār. 2nd Plur. **مارو** mārō.

Irregular examples.

‘Kahī kũ na ākhāē,’¹ Say nothing to any one.

‘Rāh vic kahī kũ salām na karāhē,’ Salute no one by the way.

6. *Potential or Indefinite Present.*

(very common in proverbs.)

I beat, &c.

Sing. 1	ماراں mārañ.	Plur. 1	ماروں māroñ.
„ 2	ماریں māreñ.	„ 2	مارو mārō.
„ 3	مارے mārē.	„ 3	مارن mārin.

Note.—When the root syllable is short the final consonant is (in some districts) doubled before the affix, as **کراں** karrāñ.

Ex. ‘Uṭh cangā māl; khātē sōññ tē khāvē jāl,’ The camel is a profitable animal. It earns gold and eats jāl.

‘Kahī tarah ñ sangatī kũ luṭṭāñ,’ By what means can I plunder this comrade?

¹ These forms are really Passive Potentials (made as in Gujarātī), used as Active Imperatives; thus

Kahī kũ na ākhāē, is literally ‘Let nothing be said to any one.’

7. *The Conditional.*

This is formed—

- a. From the Potential in agreement with the Noun, and the 3rd Pers. Sing. past of the Verb Substantive, as,—

ماراں ہا	mārā hā,	had I beaten,
ماریں ہا	mārē hā,	hadst thou beaten, &c.,
مارے ہا	mārē hā,	had he beaten.

Ex. ‘Jē gābē hal vahāin hā, dāndē dī gālh kōi puchhē hā,’ If calves had worked the plough, would any one have asked for bullocks ?

‘Jē sāī hōwē hā, mēdā bhirā na marē hā,’ If the master had been here, my brother had not died.

‘Vēc chōrē hā,’ You ought to sell it.

- b. as in Urdū with the present participle,
as, Jē sāī hōndā mēdā bhirā na mar vēndā.

8. *Present Definite.*

I am beating.

Is compounded of the Present Participle, with the Indefinite Present of the Substantive Verb. The two parts are sometimes distinct, sometimes contracted. In the latter case there is often a shade of indefiniteness in the meaning.

1st Sing.	مریندا ہاں	marēndā hā	or	مرینداں	or	marēndā.
2nd „	مریندا ہیں	marēndā hē	„	مریندیں	„	marēndē.
3rd „	مریندا ہے	marēndā hē	„	مریندے	„	marēndē.
1st Plur.	مریندے ہیں	marēndē hāī	„	مریندیں	„	marēndē.
2nd „	مریندے ہو	marēndē hō	„	مریندیو	„	marēndiyō.
3rd „	مریندے ہں	marēndē hin	„	مریندن	„	marēndin.

Ex. ‘Dōst aukhē vēlhē pakardin,’ In time of need friends are useful.

‘Jiwē kuttē janglī sūr kū aparēndin,’ As dogs catch a wild pig.

Note. The definite character of the tense is intensified by the insertion of piā (past participle of pāwanṛ, to fall) between the component parts, as

‘Karēndā piā hā,’ I am in the act of doing.

9. *The Imperfect.*

I was beating.

This is compounded of the Present Participle, and the Past tense of the Substantive Verb, as, marēndā ham, I was beating.

Ex. ‘Maī gōlēndā vī ihōjihī mōtī ham,’ I too was seeking pearls like this (the separation of the two parts is unusual).

10.

Past Tense.

I beat.

a, This is the Past Participle in agreement with the Nominative, while the person who did the beating is in the Agent.

b,—Or sometimes the person beaten is in the Dative, and the Nominative is to be found in the act expressed by the verb itself.

Examples—

(a) ‘Bādshāh āpnā naukār māriā,’ The king beat his servant.

Lit., by the king his servant was beaten.

‘Bādshāh tōp māri,’ The king fired the cannon.

Lit., by the king the cannon fired was.

‘Bādshāh naukārā māre,’ The king beat the servants.

‘Bādshāh tōpā māriā,’ The king fired the cannons.

(b) ‘Bādshāh ūkū māriā,’ The king beat him.

Lit., by the king to him beating was done.

Examples—

‘Vazīr arz kitī,’ The Vazir made a request.

‘Un ghōra bhājāyā,’ He made the horse run.

When used with personal pronouns these may either be expressed as, ‘Jaḍaṇ ūh tōpī ḍiṭhī,’ When he saw the hat; or they are attached as suffixes, as—

1st pers. sing.	, mārium	I beat.
2nd „ „	{ mārei or marōi	thou didst beat.
3rd „ „	mārius	he beat.
1st „ plur.	mariōsē	we beat.
2nd „ „	mariōvē	you beat.
3rd „ „	mariōhē	they beat.

Examples—

1st person singular—

‘Kam ḍasāyam,’ I related the matter.

‘Kitab cā ghidhiam,’ I took up the book.

2nd person singular—

‘Fāqir dā sōwāl maniēi,’ Hast thou granted the faqir’s request?

‘Sabh kujh kitōi,’ Hast thou done everything?

3rd person singular—

‘Faida na kitus,’ He got no advantage.

‘Ēh gālh kitius,’ He said this word.

N. B. Here in ‘kitius’ we have a trace of the feminine ‘kiti’ agreeing with ‘gālh.’

1st plural. ‘Salāh kitōsē,’ We took advice.

2nd plural ‘Kiyā sazā ðitōvē,’ What punishment have you given.

3rd plural—

‘Tamāsha ðiṭhōhē,’ They saw the tamasha.

‘Mēdā yār parniōhē,’ They married my lover (to some one else).

In all these cases the pronoun is in the agent, *viz.*—

Kitāb cā ghidhiam = the book taken up by me.

Salāh kitōsē = advice made was by us.

11.

Perfect.

I have beaten.

The Perfect is formed out of the Past Participle (in agreement with the Nominative) with the Present tense of the Verb Substantive, as—

‘Bādshāh āpnā naukar māriā hē,’ the king has beaten his servant.

‘Bādshāh topiā mariā hin,’ the king has fired the cannons.

In this case too the person beaten may be in the dative as—

‘Bādshāh āpnē naukar kũ māriā hē,’ lit., by the king to his servant a beating has been.

When the agent is a pronoun this is either expressed, as—

‘Maī kitāb ðiṭhī hē,’ I have seen the book.

or maī kitāb kũ ðiṭhā hē;—

or the pronoun is attached to the root of the Present of the Verb Substantive and this added after the Participle.

1st person sing. māriā him, I have beaten.

2nd „ „ māriā hēi, thou hast beaten.

3rd „ „ māriā his, he has beaten.

1st „ plur. māriā hissē, we have beaten.

2nd „ „ māriā hivvē, you have beaten.

3rd „ „ māriā hinhē, they have beaten.

The participle should agree with Nominative as—

‘Farmāish pūri kar ðittī his,’ He has fully kept the command.

‘Sārē daryā chāṇ mārē hissē,’ We have dragged all the rivers.

Here, as in all these tenses, the pronoun is in the agent.

This obsolete form of the present of the Verb Substantive is compounded of a root “hē” and the pronominal suffixes,¹ thus—

hēi = hē ī is by thee

his = hē s is by him, &c.

¹ The pronoun may represent a dative and not the agent as ‘bukār his,’ fever is to him, &c.

Mr. O'Brien in his MS. notes gives a contracted form of the perfect with these suffixes as follows—

1st Sing.	māriā him,	or mārīm.
2nd „	māriā hēi,	
3rd „	māriā his,	or māris.
1st Plur.	māriā hissē,	or mārēsē.
2nd „	māriā hēvē,	or mārēvē.
3rd „	māriā hin hē,	or mārēhē.

These contractions I have not yet met with, and, as a general rule, I think contracted forms take the shapes given under the head of the Past Tense, while the Perfect is shown by the use of uncontracted forms.—It is true that for the 3rd person singular from *ḍēkhaṇ* we find both *ḍiṭhus* and *ḍiṭhius*, but there is no distinction in meaning.

Pluperfect.

I had beaten.

12. The Pluperfect is compounded of the Past Participle agreeing with the Nominative, and the past tense of the Verb Substantive also agreeing with the Nominative as—

‘*Bādshāh āpnā naukar māriā hā,*’ The king had beaten his servant, by the king his servant beaten was, &c.

Other examples—

‘*Jērhē vēlhē tū kūndi saṭṭī hāi,*’ When you had thrown the hook, lit., when by thee the hook thrown was.

‘*Jiwē faqīr sunihā paṭhiā hā,*’ lit., As by the faqir the message was sent.

When pronouns are the agents they are either expressed as in the first of the above examples, or the Past tense of the Verb Substantive (with pronouns attached) is added to the Participle.

1st pers. Sing.	māriā ham,	I had beaten.
2nd „ „	māriā hāvē,	thou hadst beaten.
3rd „ „	māriā hāus,	he had beaten.
1st „ Plur.	māriā hāsē,	we had beaten.
2nd „ „	māriā hāsē,	you had beaten.
3rd „ „	māriā hāhē,	they had beaten.

The participle, of course, agrees with the Nominative.

Examples —

‘*Jē tōrē un dī shakal na ḍiṭhī ham,*’ Until I had seen his form, lit., As long as his form was not seen by me.

‘*Jaī tarah faqīr kū hukm ḍittā hāhē,*’ As they had ordered the faqir.

‘*Tōpā mariā hāsē,*’ We had fired the cannons, lit., The cannons fired had been by us.

13.

The Future.

I will beat.

The rule for transitive verbs is to add *ēsā*, &c., to the root, and to shorten the root syllable.

Sing. 1	مړيساں	marēsā.	Plur. 1	مړيسوں	marēsū.
„ 2	مړيسين	marēsē.	„ 2	مړيسو	marēsō.
„ 3	مړيسى	marēsī.	„ 3	مړيسن	marēsīn.

Dēkhaṇ (to see), however, is conjugated like an intransitive verb.

Khāwaṇ, to eat, makes its future *khāsā*, and *ākhaṇ*, to say, makes its future *ākhsā* and *akhēsā*.

14.

Compound Future.

I shall be beating.

Is compounded of the Present Participle with the Simple Future of the Verb Substantive.

مدين مړيندا هوساں maī marēndā hōsā, I will be beating.

15.

The Past Future,

I shall have beaten.

Compounded like the 2nd perfect, *viz.*, with the Agent in the Instrumental and the Participle agreeing with the Object (which thus becomes the Nominative), and the Future of the Auxiliary Verb, in the singular or plural, to agree with the Object.

انهاں ماريا هوسى inhā māriā hōsī, by them beaten will be he; *i.e.*, they will have beaten him.

میں ماریاں هوسن maī māryā hōsin, by me beaten will they (fem.) be; *i.e.*, I shall have beaten them.

Passive Voice.

Sir R. F. Burton wrote in 1849 :—‘The Jaṭkī dialect, like Sindhī, possesses a distinct passive voice; but with reference to it, it must be recollected that although much used and frequently occurring in Jaṭkī books and writings, it is seldom heard in conversation, and is all but unknown to the vulgar.’

E. O’ Brien wrote in 1881 :—‘Multānī differs from Pañjābī and resembles Sindhī in having a passive voice, instead of being, like other Indian dialects, obliged to compound a passive voice of the past participle with the verb *jānā*, to go.’

There is ample evidence in proverbs and stories to show that the above statements are correct and that Western Pañjābī had a distinct passive—some parts of which are still in constant use; but, at the same

time, it must be said that the passive is dying out and in its stead a compound is being used as in other Indian dialects.

The passive is formed ;¹

1. In the Infinitive, the Particles, and the Conditional by adding the syllable ' īj ' to the root, and then adding the tense endings to this root, the vowel of which, if long, is shortened ; as—

mār-aṇ	to beat	mar-īj-aṇ	to be beaten.
mār-ā̃	I may beat	mar-īj-ā̃	I may be beaten.

In Sindhi ijaṇu and in Gujarātī āvũ, is added to the root to form the Passive Infinitive.

2. In the Present Participle and Future by substituting a lighter vowel, for that which connects the root with the special endings, as—

mar-ēn-dā	beating	mar-in-dā	being beaten
mar-ē-s ā̃	I will beat	mar-ī-sā̃	I will be beaten.

Note.—Objectors to a passive say that there is such a slight difference between the forms marēsā̃ and marīsā̃, that only a very quick ear can detect it, and that when written there would be no difference whatever, unless the vowel marks are added.

This is true, but the same objection holds to Arabic passives, where قتل q t l may be qatala he killed, or qutila he is killed, and yet grammarians recognise such forms as constituting a real passive.

That the passive is dying out will be clear to any one who studies Mr. O' Brien's Glossary of the Multān language, for in it he only gives passive forms to 6 out of the 209 verbs he mentions. His book, however, is not a dictionary but only a glossary intended to illustrate the proverbs he collected.

1. *Infinitive.*

to be beaten.

ماریجنر marījaṇ.

other examples in common use are —

paṭījaṇ, to be rooted out.	dakījaṇ, to be divided.
lōṛījaṇ, to be wanted.	maṇījaṇ, to be appeased.
pakarījaṇ, to be caught.	&c., &c.

2. *Conjunctive Particles.*

being beaten.

ماریج marīj ماریج کراہیں, marīj karāhē ماریجکے marījkē.

This particular form of the passive verb is perhaps more commonly found than any other, *e. g.*,—

'Bhanīj piā,' It became broken.

'Bēṛī bharīj karāhē buddaṇ lagī,' The boat being filled began to sink.

¹ See Addenda.

It is often used with some part of the auxiliary verb ‘vanjan’ to go, as *vatij vēsī*, it will be lost—*paṭij gayā*, it was rooted out—*ṭangij kharus*, I stood (there) hung up.

3. Participles.

a. Present. *مریندا* *marindā*, being beaten.

Ex. ‘*Cicīwālā chalā sāthū piā mangindā*,

Truṭ gaī yārī, khatt piā likhindā.’

The little-finger ring is being demanded from us,

Our friendship is broken, a letter is being written.

From the Serampore New Testament :—

‘*Jō kam sabt dē dinh vic nahī karindā.*’

A work which should not be done on the sabbath day.

b. Past (doubtful). *ماریا* *māriā*.

Note.—Burton gives,

Present participle,—*karindā*, *karidī*, being done ;— which are virtually the same as above,

and says the Past Participle has two forms. It is either the same as the active, or adds ‘*ēlā*’ or ‘*ēwlā*’ to the root, as

s. m. *marēlā*,¹ killed, pl. m. *marēlē*.

s. f. *marēlī* „ „ „ f. *mareliā*.

4. Potential.

I may be beaten, &c.

1st sing.	<i>ماریجاں</i>	<i>marijā</i> ,	1st plur.	<i>ماریجون</i>	<i>marijū</i> .
2nd „	<i>ماریجیں</i>	<i>marijē</i> ,	2nd „	<i>ماریجو</i>	<i>marijō</i> .
3rd „	<i>ماریجے</i>	<i>marijē</i> ,	3rd „	<i>ماریجن</i>	<i>marijin</i> .

Examples :—

1st person,—‘*Jumerāt parnijā*,’ Let me be married on Thursday.

3rd person,—Examples of this are very common. A very usual phrase is ‘*kiyā karijē*’ or ‘*assā kiyā karijē*,’ used in the sense ‘what is to be done?’ or ‘what shall we do?’ In the latter instance *assā* is in the instrumental, and the phrase literally is, ‘By us what should be done?’

Other examples are —

‘*Khāwē biā, marijē biā*,’ One ate it, the other is beaten.

‘*Savvar banijē*,’ Let the blanket be made.

¹ This form is still in use, but with an active meaning,—Thus *marēlā*, as applied to an animal, would mean one apt to kick or strike, and is equivalent to *mārnēwālā*.

‘*Ēh marēlā shakhs hē*’ = This is a man who uses his fists on small provocation.

‘Jaī dā sar chakījē, ũ kanũ ḍar rakhījē,’ (lit.) Whose grass is stolen, from him let fear be held.

‘Var ḍekh ḍivījē, ghar ḍekh na ḍivījē,’ Let a look be given to the bridegroom, none to his family.

‘Āj dhanwījē hāuj,’ If one had a bathe to day. Dhanwījaṇ is passive from dhowaṇ, to bathe, and is here used with a middle signification.

The construction is that of the Conditional.

1st Plural—‘Ruṭhē manījũ,’ Having quarrelled let us be reconciled.

3rd Plural—‘Jē ruṭhē na manījin,’ If those who have quarrelled, be not reconciled.

‘Bhīrin sãnh, patījin bũtē,’ When bulls fight, plants get torn up.

Note.—Burton in this tense omits the characteristic j,

and writes it	}	kariã	kariē	kariē	1st	2nd	3rd	Sing.
		kariũ	kariō	karian	„	„	„	Plur.

5.

Present.

I am being beaten.

مریندا ہاں marīndā hã. See Present Active.

Ex., ‘Jēṛhā hõṛ ḍahīndē,’ As now it is obtained; ḍahīndē = ḍahīndā hē.

6.

Future.

I will be beaten.

1st sing.	مریساں	marīsã.	1st plur.	مریسوں	marīsũ.
2nd „	مریسیں	marīsē.	2nd „	مریسو	marīsō.
3rd „	مریسے	marīsī.	3rd „	مریسن	marīsīn.

Ex. ‘Jumerāt parnīsã,’ I shall be married on Thursday.

‘Saurī sāmī saṭ ghatīsē,’ Thou shalt be cast into a narrow grave.

‘Raṛh kaḍaṇ kapīsī,’ When will the field be cut?

Note.—In addition to the regular passive forms, there are many with an active form, and a passive signification. The following are from Mr. O’ Brien’s glossary.

pussaṇ, to be wetted.	russaṇ, to be annoyed.
jāpaṇ, „ known.	sanjāpaṇ, „ recognised.
jamaṇ, „ born.	kusaṇ, „ killed.
dhōpaṇ, „ washed.	luṛhaṇ, „ washed away.
ḍubhaṇ, „ milked.	visaraṇ, „ forgotten.
rābhaṇ, „ sown.	viskaṇ, „ beguiled.
rujhaṇ, „ engaged.	vismaṇ, „ extinguished.

Further Notes on the Participles.**1. *The Present Participles.***

The rule is,

- (a) intransitive verbs add 'dā' to the root ;
- (b) transitive verbs add 'ēndā' to the root ;
- (c) but all roots ending in a vowel whether transitive or intransitive add 'ndā' ;

as ā-waṇ	ā-ndā	coming.
chā-waṇ	chē-ndā	lifting.
pi-waṇ	pi-ndā	drinking.
khā-waṇ	khā-ndā	eating.

Exceptions may be found —

rakhaṇ to place makes rakhdā or rakhēndā.

ḍekhāṇ to see makes ḍekhdā or ḍēhdā.

aparaṇ to catch makes apar-ēnda or apar-dā.

Example of rakhaṇ ;— When used transitively it adds ēndā ;—

as, ' Kitāb kyū mēz utē rakhēndē hō ?'

Why are you putting the book on the table?

When used intransitively (or with abstract nouns) it adds dā ;—

as, Maī ummēd rakhdā, ' I hope.

The insertion of a negative sometimes, too, makes a difference.

Ex. ' Yuhan dē shāgird rōzā rakhdē, par tēḍē shāgird rōzā nahī rakhēndē.'

John's disciples fast, but thy disciples fast not.

A compound of the present participle is also used as in Urdu.

Ex. ' Khudā dī tārif karēndē huē bōlē,' They spake praising God.

' Jaī ghar banrēndē huē airā ghatīā,' Who, building a house, laid the foundation.

' Uhē vēndē vēndē rāh vic hāī,' And going along they were in the road.

' Chatēndē vēlhē,' Sowing time.

2. *Past Participles.*

In dealing with the Transitive Verb, *māriā* has been given as the Past Participle. This is perhaps the commonest form, and agrees with that of Urdū ; but many verbs both in Pañjābī and Western Pañjābī retain the old Sanskrit form of the Past Participle, which was, as in Latin, made with ' t ' ; e.g., as nikattha from niklaṇ, to go out.

Examples.

a. of Past participles of the old type.

pahunthā	from	pahūcaṇ	to	arrive
pithā	„	pihaṇ	to	grind
jātā	„	jāpaṇ	to	become known
cātā	„	cāwaṇ	to	lift
ḍaṭhā	„	ḍahaṇ	to	fell
ḍiṭhā	„	ḍēkhaṇ	to	see
ḍitā	„	dēwaṇ	to	give
ruṭhā	„	russaṇ	to	be annoyed
suṭā	„	samhaṇ	to	sleep
kuṭhā	„	kuhaṇ	to	kill
ghutiā	„	ghusaṇ	to	err
lathā	„	lahaṇ	to	come down
muṭhā	„	musāṇ	to	be unlucky
mutā	„	munjaṇ	to	send
naṭhā	„	nasāṇ	to	flee
nītā	„	nēwaṇ	to	take away
vuṭhā	„	vasāṇ	to	rain
vāṭhā	„	vahāwaṇ	to	cause to move.

b. of irregular past participles.

punā	from	pujaṇ	to	arrive
piā	„	pawaṇ	to	fall
ḍudhā	„	ḍubhaṇ	to	be milked
rudhā	„	rujhaṇ	to	be engaged
khādhā	„	khāwaṇ	to	eat
lāyā	„	lāwaṇ	to	attach
vadā	„	vataṇ	to	wander
viskpā	„	viskaṇ	to	be beguiled
vuṛhā	„	vahaṇ	to	flow.

Some Conjunctions.

اے	attē, and. In Serampur New Testament atthē. Commonly atē or tē, in Sanskrit atha.	بہل	bhal, but.	
		بہلکرتوں	bhalkaṇū, but.	
		جے	jē,	} if.
تاں	tā, so.	جیکداہاں	jēkadāhā	
جو	jō, that.	جیکر	jēkar,	
تائجو	tājō, in order to.	ول	val, again,	

کیونچو kyūjō, because.

متذّر matar, if perchance.

وي

vī, and, Urdū bhī.

هتھوں

hathū, but.

N. B. The commonest conjunction in the Serampore New Testament is (?) ba, 'and'; but I can find no trace of it in modern Multānī.

Some Postpositions.

کول kōl, to, at.

نال nāl, with.

اُتے uttē, or تے (tē) on.

وچ vic, in.

دو dū, towards.

کنّی kannē, to.

کوں kū, to.

تائی tā'ī, until.

تورے tōrē, until.

کیتے kitē, for.

کارں kārān for the sake of.

وانگن or وانگوں vāgū or vāguṇ, like.

واسطے vāstē, for.

بار pār, across.

سوب sawab, on account of.

Some Adverbs.

(a) of Manner.

ایزویں iwē, in this way.

اونویں ūwē, in that way.

کیدویں kiwē, in what way.

حیدویں jiwē, as.

تیدویں tiwē, so.

ایجہاں ijihā so.

تدنر tādān

تداں tadāḍ

کدنر kaḍān

کیتورے kitōrē

جیتورے jītōrē

ولا valā

جہت jhat

اجنر ajaṇ

ھونر hōṇ

اچاچیت accācēt

اچنرچیت acāncēt

جلتی jaltī

ناں ناں nāṇ

تداھاں tadāhā

} then.

when.

} see post-positions

until.

again.

at once.

still.

now.

suddenly.

,,

quickly.

suddenly.

then.

Note.—Where Urdū uses sā, or thōrā sā, a little, Western Pañjābī uses jihī or jihā

Ex., Mēḍī dārhī thōlī jihī hāi, my beard had become rather thin.

(b) of Time.

جڈتّر jadāṇ, when

جداں jaddā, ,,

This is sometimes used in this way,—jadāṇ dā māi āyā, Since I came.

(c) of Place.

پورے parē, far.

پرے parrē, far.

اگے aggē, before.

اِتھاں ithā, here.

اُتھاں uthā, there.

کِتھاں kithā, where ?

جِتھاں jithā, where, (relative).

پچھیں pichē, behind.	{	اِٹھائی ithāī, this very place.
چودھار caudihār, on all sides.		اُٹھائی uthāī that very place.
نیرے nērē, near.		کتھائی kithāī in which place ?
سامنے sāmñē, in front of.		جٹھائی jithāī in which place.

(d) *Various.*

بہں bhū, much.	نیرا nīrā	} only.
موج muc, much, (peculiar to the Hazārā.)	نیری nīrē	

کیوں kyū, why

پیا piā. (Past Participle of pawaṇ, to fall), is used as a sort of intensive adverb, to add strength to verbs, as ;—

‘Mēḍā pai piā āndā,’ My husband is coming.

‘Lahndē piē hē,’ They were coming down.

Addenda.

While these ‘Rough Notes’ have been passing through the press, much additional matter has come to hand. The greater part of this must be reserved till the writer can find opportunity to bring out a more perfect grammar of this language, but some must be dealt with here.

Nouns.

1. There is a distinct Locative case used to express,—

a. Time when, as ‘hik ḍihārē,’ On one day.

‘kēṛhē vēlhē,’ At what time.

b. Place where ;—

Sing. i or ē

Plur. ē

as ‘Uh Āmbi hē,’ He is at Āmb.

‘Uh gharē hē,’ He is at the house.

‘uhē apñē gharē hin’ They are at their houses.

c. Manner ;—

‘Uhē nangē pairē dhrukē āē,’ They came running with naked feet.

2. The Ablative ending ũ or ñ.

There are two endings with distinct meanings.

a. The ablative ‘from’

b. A contraction for āhũ, meaning ‘somewhat’

This latter is used

(1.) with the addition of tē, thus ;—

‘Aggũ tē āō,’ Come somewhat forward.

‘Piccũ tē vanjō,’ Go somewhat back.

(2.) without it, as ;—

‘Kolhũ,’ Somewhere near

‘Dhũ,’ Somewhere towards ; thus,—

‘Aggũ faqīr piccũ shāhzāda, Somewhat in front the
faqīr, somewhat behind the prince.

the full form is sometimes used, thus,—

‘Maĩ agāhũ khābar paṭhi,’ I sent on word somewhat ahead of
me.

and always in the common word

Ōrāhũ, Somewhat on this side.—It has survived in this word
probably because it is mistaken for ōrē āō, ‘Come on
this side.’

Infinitives.

1. The ordinary infinitive is used as a Verbal Noun, thus ;—

‘Undā maraṇ qabūl kitum,’ I have consented to his death.

‘Undē maraṇ dā tars āyam,’ I am concerned at his death.

2. The extraordinary Infinitive contains the idea of something
which must be done, thus ;—

‘Un ningir dā parṇā thiā,’ The time came for that girl
to be married.

‘Qāzi unhē kitē khāwaṇā paṭhiā,’ The qazi sent them some-
thing to eat,

lit. something which was to be eaten.

‘Parṇā khushi nāl hē natā marṇā,’ One must marry to please
oneself, otherwise death would be prefer-
able.

This Infinitive is declinable like an adjective, thus ;—

a. ‘Jind hik dihārē khudā ghinnī, rōz rōz tā na marṇā,’

Life will be taken by God one day, we have not got to die
every day.

Here ghinnī is Fem. Sing ; agreeing with jind,

‘Life has got to be taken.’

b. ‘Pin khāwaṇē faqīr kũ,’ To a faqīr who has to eat what he
gets by begging.

Here khāwaṇē is formative Masc. Sing.

c. ‘Jitlē vas lāwaṇē hāī, tā cukē,’ Whatever powers they had to
expend, they expended to the full.

Here lāwaṇē is Nom. Plur. Masc. agreeing with vas.

d. ‘Du galhē tāī kanũ pucṇiā him,’ Two questions I have, which
must be asked from you.

Here pucṇiā is Fem. Plur. agreeing with gālhē

Passive.

The full form of the addition to the root is *ij* as in *marijaṇ*, to be beaten.

But it is softened down into two other forms,

a. by substituting *w* for *j*, thus;—

mariwaṇ to be beaten. This is common in *Shāhpur* and *Bahāwul-pur*, and occasionally is met with in intermediate parts,

b. by leaving out the *j* altogether, as;—

mariaṇ, to be beaten.

This is the form that Sir R. F. Burton gives, and it is the form adopted by the so-called Active past participle which, as will easily be seen from the examples given, is a Passive participle, thus *māriā*, beaten.

In addition to these modifications of the original root we not uncommonly find.

c. a root in which *ā* is added between the original root of the verb and the ending. This is the same as the Gujarātī Passive.

Thus in the Parable of the Prodigal Son (see Appendix) we have twice.

‘*Maī lāiq nahī jō tēḍā putr ākhāwā,*’ I am not worthy that I should be called thy son.

The following examples are from Mr. O’Brien’s glossary.

‘*Yār asāḍē kū salāḍ ḍiwāhē,*’ Let a *salām* be given to my lover.

‘*Sāwan vahāē, tē Katē rahāē, tē Pōh pilāē;*’ Let the ploughing be done in *Sāwan*, the sowing in *Katē*, and the watering in *Pōh*.

‘*Jaṭ dilāsā ḍēvē, jāī vēlhē hāl vahāē,*’ The *jaṭ* gives encouraging promises (to the *Banya*) when the plough is being driven.

To forms b and c all so-called Precative or Polite Imperatives may be referred. They are really passive Potentials, see those on page 314.

Thus the common word in *Urdū*,

‘*Baiṭhiē,*’ pray sit down, belongs to form b., and here in English we have retained the idiom for we say ‘be seated’ when we wish to be polite.

‘*Likhiē,*’ write, is ‘Let it be written.’

‘*Kāvir na thiwāē,*’ Don’t be angry, literally, let not anger be made to be come.

‘*Khuda bhulāwē,*’ May God not forget, is literally ‘By God may it not be forgotten.’

Mr. O’Brien in his glossary gives under the head of *chēraṇ*, to provoke,

‘*Jangal jaṭ na chēriē,*’ Do not vex a *Jaṭ* in the jungle.

lit. Let not a *Jaṭ* be vexed in the jungle.

Appendix I.

Notes on the translation of the New Testament into the Multānī language, by the Serampur Missionaries.

This translation was published by the celebrated missionaries Carey, Marshman and Ward, in 1819.

They evidently intended at first to translate the whole Bible, for a copy issued in 1819 is called 'Vol. 2, Containing the New Testament.' This is, however, omitted in copies issued in 1821.

Though the title page calls it the Multānī language, the printer's marks at the bottom of the pages call it 'Wutch' or 'Wuch' which lead one to imagine that their translator was a native of Uc in the state of Bahāwulpur.

After some deliberation they adopted the Banyā characters (and in those days, probably, more persons could read these than any other characters), and they had special type prepared for the purpose; but in the get up of the book they made some mistakes, for it is bound as an English book with an English Title Page, and the characters are printed very much smaller in size than they are generally written. The result is that if it is shown to a Hindū, and he is asked whether he can read it, he promptly replies 'No I can't read English.' If he is asked to look more closely at it, he fails to recognise the characters, owing to their small size, as those that he is in the daily habit of writing. Only once or twice have I succeeded in getting a man to recognise the language as his own, and to read me parts of the book. To this, too it must be added that 70 years have made a great difference in the shape of many of the characters, and even in the words of the language; for in those days Multān was not connected with the Pañjāb, but, together with Sindh, was nominally part of the Viceroyalty of Kandahār and was ruled by Afghans.

As for the translation it may be pronounced on the whole good, especially the gospels of SS. Mark, Luke, and John, and the Acts of the Apostles. St Matthew's gospel, on the other hand, is very poor and was almost certainly the work of a different man. The Epistles, too, are not satisfactory, as there are many words and expressions in them for which no equivalent could be found in Multānī, and the translator has accordingly contented himself with copying down in the Multānī characters the words of the translation before him.

One would be curious to know how many copies were printed and

how they were distributed, and what has become of them. About 5 copies are now known to be in existence.

In Plates XXVIII and XXIX will be found the characters used in the Serampur translation compared with those now used in Multān and Uc.

Appendix II.

Extract from Census Report of 1891.

Jaṭkī or Multānī is the language of the Lower Indus Valley in this Province. From its prevalence in the Dērajāt it is also called Dērāwāl and also Hindī, Hindkō or Hindkī. It is also known as Bahāwulpurī.

I have entered it as Jaṭkī because this name was used in 1881, but the term was used in the schedules only in the Dērā Ghāzī Khān district. The term Multānī was confined to the districts of Multān and Muzaffargāh while the term Hindkī was used on the rest of the Dīrajāt frontier. Hindī, Hindkō and Hindkī are terms much confused by the people. Hindkī is more commonly applied to the Jaṭkī language while Hindkō is more frequently used for the Pañjābī dialect spoken on the Northern part of the Indus. I have drawn an arbitrary line between the Banū and Kohāt districts and have classed all entries of Hindī, &c., *South* of that line with Jaṭkī and all *North* of that line with Pañjābī. I can not, however, ascertain what course was pursued in 1881, but the figures give no clue to the real facts and only show that some different system of classification of the items must have been adopted in 1881. The returns from Bahāwalpur would seem to imply that some general orders had been given at the present Census for the return of the language of that state as Pañjābī or Hindī instead of Jaṭkī; for the Pañjābī speakers of this Census are nearly 6 times as numerous as in 1881, while the Jaṭkī speakers have fallen to a quarter of the previous figure.

Abstract No. 51 showing the number of persons speaking each language returned in the schedules.

Jaṭkī, i. e. {	Jaṭkī	...	...	79,156
	Pañjābī (in Muzaffargāh)	...	...	4,416
	Dērāwāl	...	...	32,106
	Hindkī (in Dērājāt)	...	...	576,732
	Hindkō (in Dērājāt)	...	...	511
	Jāfarkī	...	...	21
	Hindī (in Bahāwulpur, Bannū, Dērā			
	Ishmaīl and Dērā Ghāzī	...	...	311,695
	Multānī	...	...	895,285
				<hr/> 1,899,922

From Abstract 52, we get the following results.

Name of District.				Total Popula- tion.	Percentage Speaking Jaṭkī.	<i>i.e.</i> , roughly.
Multān	...	...	...	631,434	84·99	536,000
Muzaffargarh	...	...	...	381,095	96·72	370,000
Ḍērā Ghāzī Khān	...	...	...	404,031	89·663	364,000
Ḍērā Ishmāil Khān	...	...	...	486,201	83·05	403,000
Bahāwulpur	...	...	...	650,042	21·47	136,000
Bannū...	...	...	...	372,276	25·42	93,000
Total				2,925,079	.....	1,902,000

The following returns from certain districts show how many people returned themselves as speaking Western Pañjābī.

Name of District.				Total Popula- tion.	Percentage speaking Jaṭkī.	<i>i.e.</i> , roughly.
Shāhpur	...	...	...	493,588	99·85	493,000
Jhīlam	...	...	...	609,056	99·49	608,000
Rāwal Pindī	...	...	...	887,194	94·22	834,000
Hazārā	...	...	...	516,288	92·29	474,000
Peshāwar	...	...	...	703,768	17·9	126,000
Kōhāt	...	...	...	203,175	20·75	42,000
Bannū	...	...	...	372,276	21·6	82,000
Bahāwulpur	...	...	...	650,042	72·12	468,000
Total				4,435,387	.....	3,127,000

Notes on the above abstracts.

Bearing in mind the difficulties of ascertaining the character of the dialect spoken in each district, owing to the variety of local names; and remembering that both in the Multān district and the Hazārā the popular name for the local dialect is Pañjābī, no matter how much it may differ from the Pañjābī of Amritsar, I think we may say that all who are returned as speaking Jaṭkī do speak what I have endeavoured to describe as Western Pañjābī. With those returned as speaking Pañjābī it is more difficult to deal, but I should think it probable that the language of at least two-thirds of the people in Rāwal Pindī, Hazārā, Peshāwar, Kōhāt and Bannū, and one-third of those in Jhīlam and Shāhpur, was more akin to Western Pañjābī than to Pañjābī proper.

With regard to Bahāwalpur the real figures probably lie about half way between those of 1881 and 1891. Those of 1881 are certainly over the mark, for it is unlikely that in those parts of the State which lie alongside the Montgomery and Lahore districts Western Pañjābī is spoken. There we should find Pañjābī, and, on the other hand, in the Southern parts of the State, the language is largely influenced by Sindkī. Reckoning roughly in this way, I think we must add another 1,500,000 to the 1,900,000 who are returned as speaking Jatkī which will give about 3,400,000 speaking Western Pañjābī; but I must repeat that I have no certain information from the districts of Shāhpur, the Salt Range, &c., and can only hope that the issue of these notes will bring some from those parts.

APPENDIX III.

THE PARABLE OF THE PRODIGAL SON IN WESTERN PAÑJĀBĪ, *In the Persian Character.*

- (۱۱) وٽ آڪهڻس - هڪ شخص دے ڌو پٽر هائين *
- (۱۲) انهيں وچوں نندھے پيو کوں آڪهيا - جو ائیں پيو ميکوں هونتر دے - جتلا حصہ مال دا ميکوں پهونچدا هے - اتے اوں اپترين جائداد انهيں کوں ونددتي *
- (۱۳) اتين تهولے دھاريں کنوں پچھين نندھے پتر سبھہ کجهہ کٽها کر کے هڪ پترين دے ملڪ وچ ونج ريهہ - جتھان اپنتران مال بد چلنترين وچ اودائس *
- (۱۴) ائين جدنتر سبھو خرچ کر چکيس - تاں اوں ملڪ وچ وڌا کال پيا - ائين او محتاج تهيدونتر لگا *
- (۱۵) تدنتر اوں ملڪ دے هڪ رئيس دے کولھہ ونج لگا - جيں اپنترين رڙين وچ سوهر چوانتر پٽھيس *
- (۱۶) اتين اوندي آرزو هائي جو انھين چهلترين کنوں جو سوهر کھاندے هن - اپنتران پيت بھرے کيونجو کوئي اونکوں کجهہ به دیندا ها *
- (۱۷) تدنتر هوش وچ آکے آڪهڻس ميدے پيو دے کٽلے مزدوريں کوں بهوں بهوں روٽي ملدي هے - اتين مين بکھا پيا مردا هاں *
- (۱۸) مين اٿهي کراھين اپنترين پيو کولھہ ويساں - ائين او کوں آڪھساں جو اے بابو - خدا دا تے تيدے سانھنترين گناہ کيتم *
- (۱۹) ائين هنتر اوں لائق نمھين جو ولا تيدا پتر آڪھواواں ميکوں انپترين مزدوريں وچوں هڪ و انگر بڌرا *
- (۲۰) تدنتر اٿهي کراھين اپنترين پيو دھوں ٿريا - جدنتر او اجنتر پورے ها - اوندے پيو او کوں دٿها - تے توس آئيس اتے درک کراھين او کوں گلا گھدا تے دھير چمئيس *

(۲۱) پترو او کوں آکھیا جو اے بابو خدا دا تے تیدے سانہہنڑیں گڈا کیتم ۔ اتیں
ہنڑ اوں لائق نہیں جو تیدا پتر اکھواواں *

(۲۲) پدو ابڑیں نوکریں کوں آکھیا جو چنگیں توں چنگیں پوشاک کدھہ گھن او
اتیں اونکوں پواؤ اتیں اوہے ہتھہ وچ مذہری تے پدیں دے واسطے
اوکوں جتیاں تو *

(۲۳) اتیں پالیہ ہوئے وچھے کوں آن کراہیں ذبح کرو جو کھاون تے خوشی مناوں *

(۲۴) کیونجو میدا اے پتر موا ہا اتے ول جیندا تھیا ۔ ونجیج پدا ہا ہنڑ لبھیا ہے
تدنڑ او خوشی کرن لگے *

(۲۵) اتیں اوندا ودا پتر رزہ وچ ہا جیتھے ویلہہ ماری دے ندرے آندا پدا ہا ۔
گاوتر تے نچنڑ دی آواز سنڑیڈس *

(۲۶) اوں ویلہہ ہک بیلے کوں سد کراہیں پچھئیڈس جو اے کیا ہے *

(۲۷) اوں آکھئیڈس جو تیدا بھرا آ پہنچا ہے ۔ اتیں تیدے پدو پالیا ہویا وچھا ذبح
کیتا ۔ ایں سبیدوں جو اونکوں چنگا بھلا پائس *

(۲۸) اوں خفا تھی کراہیں اندر ونجنڑ نہ چاہیا تاں اوندا پدو باہر آے
اونکوں مذایا *

(۲۹) اوں پدو کوں جواب وچ آکھیا ۔ دیکھہ اتلے ورھیں تونڑیں تیدی خدمت کریںدا

ریہم ۔ اتیں کدھیں تیدے حکم کنوں باہر نہ تھیم ۔ پرتوں کدھیں ہک

بکری دا بچہ میکوں نہیں دتا ۔ تاں جو انپڑیں دوستیں نال خوشی کراں *

(۳۰) ہتھوں جدنڑ تیدا ایہو پتر آیا ہے ۔ جیں تیدا مال کنجریں وچ آدایا ہے
توں اوندے کیتے موتا وچھا ذبح کیتا *

(۳۱) اتیں اوں اونکوں آکھیا ۔ اے پتر توں سد میدے کو لہہ ہیں اتیں جو کچھ
میدا ہے سو تیدا ہے *

(۳۲) پر خوشی کرنڑے خوش تھینڑ لازم ہا کیونجو تیدا ایہو بھرا موا ہا سو
جیندا تھیا ۔ اتیں ونجیج پدا ہا سو لبھیا ہے *

The same in the Dēva-nāgarī character.

(۱۱) वत आख्यस हिक शखस दे डू पुत्र दायन ॥ (१२) उन्हीं विचूं नंढे
पू कूं आख्या जो ए पू मैकूं हूण डे जितला हिस्सा माल दा मैकूं पहुंचदा हे ।
अते ऊं आपणी जायदाद उन्हीं कूं वंड डित्ती ॥ (१३) अते थोले डिहारे कनू
पिके नंढे पुत्र सभ कुम्ह कट्टा कर के हिक परें दे मुक्क विच वंज रीहा जियां

आपणा माल बद चलणी विच उडायुस ॥ (१४) अतें उथां जडण सभो खर्च कर
 चुक्युस तां ऊं मुल्क विच वडा काल पिया अतें हुण ओ मुथाज थीवण लगा ॥
 (१५) तडण ऊं मुल्क दे हिक रईस दे कोल्ह वंज लगा जै आपणें रटें विच सूहर
 चरावण पक्युस ॥ (१६) अतें उंदी आरजू हाई जो उन्हे किलरीं कनों जो सूहर
 खानदे हन आपणा पेट भरे क्यूं जो कोई उंकूं कुम्ह ना डेंदा हा ॥ (१७) तडण
 होश विच आ के आख्युस मेडे प्यू दे कितले मजूरें कूं बहूं बहूं रोट्टी मिलदी हे
 अतें मैं मुखा पिया मरदा हां ॥ (१८) मैं उठ कर आपणें प्यू कोल्ह वेसां अतें
 ऊ कूं आखसां जो ए बाबू खुदा दा अते तेडे सामणें गुनाह कीतुम ॥ (१९)
 अतें हुण ऊं लायक निम्ही जो वल तेडा पुत्र अखवावां मैकूं आपणें मजूरें विचूं
 हिक वांगुण बणा ॥ (२०) तडण उठ करांहीं आपणें प्यू धूं टरिया । जडण ओ
 अजण परेहा उंदे प्यू ऊकूं डिठा ते तर्स आयुस अते द्रुक करांईं ऊकूं गल्ला गिधा
 अते ढेर चुक्युस ॥ (२१) पुत्र ऊकूं आख्या जो ए बाबू खुदा दा अते तेडे सामणें
 गुनाह कीतुम अतें हुण ऊं लायक निम्ही जो तेडा पुत्र अखवावां ॥ (२२) प्यू
 आपणें नौकरें कूं आख्या जो चंग्यी तूं चंग्यी पुशाक कढ धिन आवो अतें ऊकूं
 पवावो अतें उंदे हथ विच मुंद्री ते पेरे दे वास्ते ऊकूं जुती डेवो ॥ (२३) अतें पाल्ये
 ओये वच्चे कूं आन करांहीं ज़बा करो जो खावन तें खुशी मनावन ॥ (२४) क्यूं
 जो मेडा ए पुत्र मोआ हा अतें वल जीनदा थिया वंजीज पिया हा हुण लभ्या हे ।
 तडण ओ खुशी करण लगे ॥

(२५) अतें उंदा वडा पुत्र रट विच हा जेठे वेल्हे मारी दे नेरे आनदा
 पिया हा गांवण तें नचण दी अवाज सुण्युस ॥ (२६) ऊं वेल्हे हिक बेगी कूं सड
 करांहीं पुक्युस जो ए क्या हे ॥ (२७) ऊं आख्युस जो तेडा भिरा आ पहुंचा
 हे अतें तेडे प्यू पाल्या ओया वक्करा जबा कीता ईं सबबूं जो उंकूं चंगा भला
 पायुस ॥ (२८) ऊं खफ़ा थी करांहीं अंदर वंजण ना चाह्या तां उंदा प्यू बाहिर
 आ के उंकूं मनाया ॥ (२९) ऊं प्यू कूं जवाब विच आख्या डेख इतले वच्चीं
 तोणी तेडी खिदमत करेदा रिहुम अतें कडांहीं तेडे हुकम कनूं बाहिर ना
 थीयुम पिर तौं कडांहीं हिक बकरी दा वच्चा मैकूं नहीं डित्ता तांजो मैं
 आपणें दोस्तां नाल खुशी करां ॥ (३०) हथूं जडण तेडा एहो पुत्र आया हे
 जै तेडा माल कंजसां विच उडायो तौं उंदे कीते मोटा वक्करा ज़बा कीता ॥
 (३१) अतें ऊं उंकूं आख्या ए पुत्र तूं सदा मेडे कोल्ह हें अतें जो कुंक् मेडा हे
 सो तेडा हे ॥ (३२) पर खुशी करण ते खुश थीवण लाजिम हा क्यूंजो तेडा
 ईहो भिरा मोआ हा सो जीनदा थिया अतें वंजीज पिया हा लभ्या हे ॥

On Pronominal Suffixes in the Kāçmīrī Language.

BY G. A. GRIERSON, PH. D., C. I. E.

[Read December, 1895.]

To most students of the Indo-Aryan Vernaculars, the question of pronominal suffixes has not been a familiar one. They were known to exist in Sindhī, and the few scholars who had studied Kāçmīrī, remembered them as the chief difficulty of that language; but elsewhere in India they have not been met with in any Aryan speech. They were equally strange to the Dravidian languages, and the only language on this side of India, which uses them freely is Saontālī. On the other hand, to any one who has studied Persian, or the Semitic languages, they are familiar. In Hebrew they occur frequently. *E.g.*, in the Genesis i. 11, in the phrase ‘the fruit tree yielding fruit after his kind,’ the words ‘after his kind’ are represented by the one word לְמִינוֹ *l'mīnō*, in which *l'* is merely a preposition. The word *mīnō*, is compounded of the word *mīn*, ‘fashion,’ and the pronominal suffix *ō*, ‘his.’ So also in Arabic, in the well-known phrase عَلَيْكُمْ السَّلَام *‘alaikum as-salāmu*, ‘on you be peace,’ the *kum* of ‘*alaikum*,’ ‘on you,’ is a pronominal suffix. Again, in Persian, پرسیدمش *pursīdamash*, means ‘I asked him,’ and the termination *ash*, ‘him,’ is a pronominal suffix. All these pronominal suffixes differ from the full form of the pronouns when used separately. The Hebrew for ‘he’ is הוּא *zeh*, not *ō*, the Arabic for ‘you’ is أَنْتُمْ *'antum*, not *kum*, and the Persian for ‘him’ is او *ū-rā*, not *ash*.

As not only Persian, but the two other Iranian languages which border the North-West of India, *viz.*, Pashtū and Balōcī, use these pronominal suffixes, it has been assumed by many philologists that their use by Sindhī and Kāçmīrī, the two extreme north-western languages of India, was borrowed by them from their neighbouring Iranian cousins. Others have suggested Arabic influence, brought to bear by religion on these two Musalmān nationalities. I think that I shall be able to prove that neither of these two theories is true, but that there is a North-Western family of Indo-Aryan languages, closely connected with those of the East of India, which use pronominal suffixes of purely Indo-Aryan origin.

These suffixes have existed in Aryan languages from the most ancient times, and still exist. We find them for instance in modern Italian as in *date-mi*, 'give me,' in mediæval Irish, as *fri-m*, 'against me,' and ancient Greek as in the enclitic $\mu\acute{\epsilon}$, 'me.' Going furthest back we find Zend, the parent of Pashtū and Balōcī, with the enclitic forms *mā* (acc.) *mē* and *mōi* (gen. and dat.) for the first person, *thwā* (acc.) *tē* and *tōi* (gen. and dat.) for the second, and *hē*, *hōi* (gen. and dat.) for the third, the direct progenitors of the Pashtū *mi* (1st. person), *di* (2nd. person), and *ya* (3rd. person), and of the Balōcī *ī* (3rd. person). Similarly the modern Persian forms are derived from the Old Persian of the Achemenides, through the Pehlevī of the Sassanides. Thus Prs. *am* (1st. person) is derived from the Phl. *am*, O. Prs. *maiṣ* (enclitic dat.). So Prs. *at* (2nd pers.), Phl. *at*, O. Prs. *taiy*; Prs. *ash* (3rd pers.), Phl. *ash*, O. Prs. *shaiṣ*.

In the same way, if we take Sanskrit as the nearest representative of the ancient Indian Vernacular from which the modern Vernaculars are descended, we find that it also like Zend and Old Persian had enclitic pronouns, viz.—

1st. Prs.; Sg., Acc. *mā*, Dat., Gen., *mē*; Pl., Acc., Dat., Gen., *nas*.

2nd. Prs.; Sg., Acc. *tvā*, Dat., Gen., *tē*; Pl., Acc., Dat., Gen., *vas*.

3rd. Prs.; Sg., Acc. *ēnam* (masc.), *ēnat* (neut.), *ēnām* (fem.); Pl., Acc. *ēnān* (masc.), *ēnāni* (neut.), *ēnās* (fem.).

This last is also regularly declined in certain other cases, and in the dual.

It will be seen from what follows, that a series of pronominal suffixes, more or less complete, exists in several modern Indo-Aryan Vernaculars, which too is derived from Old Indian pronouns, including all the above enclitic forms which have been preserved to us by Sanskrit.

Ever since I have had opportunities of studying the Kāçmīrī language, I have been struck with its evident close relationship to Sindhī. This relationship was not easily explained, for, till a few weeks ago the territories in which these two languages were spoken were believed to be separated by many hundred miles of country inhabited by a population speaking a totally different language,—Pañjābī. There was no historical or territorial connexion between these two widely separated but closely connected languages. The annexed map will show roughly the hitherto accepted geographical limits of Sindhī, Pañjābī and Kāçmīrī.



Last October, I received from the Rev. T. Bomford, a missionary stationed at Multān, a grammar of the Western Pañjābī ‘dialect,’ which will be found to change all our former ideas on this subject. We have hitherto known a dialect of Pañjābī called Multānī, which has been well illustrated by the late Mr. O’Brien’s *Multānī Vocabulary*. This hitherto has been localized in the South of the Pañjāb, round Multān, in the districts bordering on Sindh, and, as it bore many close points of resemblance to Sindhī, it was assumed, on the information then available, to be a sort of border dialect, through which Sindhī merged into Pañjābī. Mr. Bomford now shows that what has hitherto been called Multānī, from the place where it was first observed, is not a border language between Sindhī and Pañjābī at all. It is the language of the Pañjāb, west of, roughly speaking, the Jhelum, till it meets the Pashtū spoken, west of the Indus. Pañjābī has hitherto been measured by the standard of Amritsar, a town some forty miles east of Lahore, midway between the Rāvī and the Satlaj; and our grammars, dictionaries, and literature have been based entirely on the language of the east of the Pañjāb. The grammars stated, and it was known as a general fact, that the language of the western Pañjāb differed from that of the east, but few

attempts, till Mr. Bomford undertook the task, were made to investigate the points of difference, and it was too readily assumed that Pañjābī had two dialects, a standard and a western. Mr. Bomford's grammar shows that this is not true. That *western Pañjābī can in no sense be called a dialect of standard Pañjābī, but is altogether a distinct language, closely connected with, and forming the uniting link between Sindhī and Kāçmīrī.* These three languages, Sindhī, Western Pañjābī, and Kāçmīrī, now allow themselves to be classed as forming a North-Western Family of Indo-Aryan Vernaculars, markedly differing from what has hitherto been called the Western, but from what must now be called the West-Central, or Central Family. We thus find ourselves compelled to re-classify these Vernaculars in the following way.

(The figures show the approximate population speaking each language).

OLD CLASSIFICATION.

A. WESTERN FAMILY.

(a) *North-Western Group.*

Sindhī (2,590,000)

Kāçmīrī (4,090,000)

(b) *West Central Group.*

Pañjābī (17,720,000)

Gujarātī (11,060,000)

Rājputānī, (13,150,000)

Hindī (35,820,000)

(c) *Northern Group.*

Central Pahārī (1,150,000)

Khas or Naipālī (3,020,000)

B. EASTERN FAMILY.

(d) *East Central Group.*

Baiswārī (20,000,000)

Bihārī (30,000,000)

(e) *Southern Group.*

Marāṭhī (18,930,000).

(f) *Eastern Group.*

Baṅgālī (41,340,000).

Assamese (1,440,000).

Urīyā (9,010,000).

Total Aryan speaking population of India, 209,320,000.

NEW CLASSIFICATION.

A. NORTH-WESTERN FAMILY.

(a) *North-Western Group.*

Sindhī (2,590,000)

Kāçmīrī (4,090,000)

Western Pañjābī (3,000,000)

B. CENTRAL FAMILY.

(b) *West Central Group.*

Eastern Pañjābī (14,720,000)

Gujarātī (11,060,000)

Rājputānī (13,150,000)

Hindī (35,820,000)

(c) *Northern Group.*

Central Pahārī (1,150,000)

Khas or Naipālī, (3,020,000)

C. EASTERN FAMILY.

(d) *East Central Group.*

Baiswārī (20,000,000)

Bihārī (30,000,000).

(e) *Southern Group.*

Marāṭhī (18,930,000).

(f) *Eastern Group.*

Baṅgālī (41,340,000).

Assamese (1,440,000).

Urīyā (9,010,000).

The new classification of the North-Western languages is shown in the accompanying map.



This North-Western Family, while widely differing from the Central Family, both in grammar and in vocabulary, has many peculiarities common to all the languages which compose it. One of the principal points of community is the use of pronominal suffixes, a practice altogether unknown to the languages of the Central Family but reappearing in those of the Eastern Family.

I now proceed to consider the pronominal suffixes of Kāçmīrī, and, in doing so, shall compare them with those of the other languages of the North-Western Family. Speaking of Kāçmīrī, Dr. Bühler says,¹ 'I believe that it has the greatest importance for the comparative grammar of the Indian Vernaculars, because, for instance, it so clearly reveals the manner in which the new cases of the declension have been formed from the old bases.' This is certainly true of Kāçmīrī, but I think that it, and the languages of the North-Western Family generally, are of still more importance, as indicating the probable course of future development of the other Indo-Aryan Vernaculars. Sanskrit and Prakrit are synthetic languages. Most modern Indo-Aryan Verna-

¹ J. R. A. S., Bo. Br., xii (1877, Ex. No. , 89.

culars, while still retaining traces of the synthetic nature of their earlier stages of development, are on the whole analytical. In the North-Western Family we can watch such analytical languages in the very act of completing the circuit, and becoming agglutinative. So the 'weary round of existence' of languages goes on. First agglutinative, then synthetic, then analytic, and then agglutinative again. An agglutinative language is one in which some words have lost their power of being used as nouns or verbs, and can only be employed as particles, in which capacity they are added to nouns to form case endings, and to verbs to form tense and person endings.¹ This is exactly what we see occurring in the North-Western Family, and especially in Kāçmīrī.

When a Kāçmīrī wishes to say 'I am,' he takes the word for 'is,' and tacks on to it a pronominal suffix meaning 'I.' This does not prevent him prefixing the full pronoun 'I' as well. He says, not 'I am,' but 'I is-I,' *bo chu-s*, in which *s* is the pronominal suffix of the first person. Again, if he wishes to say 'thou art,' he says *tsa chu-k*, 'thou is-thou'. So also for other cases. The word *mor^u* means 'killed.' If he wishes to say 'I killed,' he says 'by me killed-by-me,' *me moru-m*, in which *m* is suffix of the 1st. pers. in the instrumental. If he wishes to add the person who was killed, and to say 'I killed you,' he says 'by me killed-by-me-you you,' *me mōri-ma-va tohⁱ*. Here *me* means 'by me;' *mōriⁱ*, is the masculine plural of *mōr^u*, agreeing with 'you;' *m* is the suffix of the first personal pronoun in the instrumental (with *a* added for the sake of euphony); *va* is the suffix of the 2nd. personal pronoun plural, in the nominative, and *tohⁱ* means 'you.' Again *bo balrāva-k tim* 'I will heal them,' is literally 'I (*bo*) will-heal(*balrāva*)-them(-*k*) them (*tim*)' (the Future, or Old Present, being one of the tenses which does not take the personal terminations in the nominative, being a synthetic tense, derived from the old Sanskrit Present). Again (to illustrate a dative pronominal suffix) *tamⁱ dop^u-na-s*, means 'he spoke to him,' literally 'by him (*tamⁱ*) spoken (*dop^u*)-by-him (*n*, with euphonic *a*)-to-him (*s*)'.

From the above, it will be gathered that there are different Kāçmīrī suffixes for the various cases of the Personal Pronouns, and such is the case, except that there are no suffixes for the plural of the first person. The following is a complete list of these suffixes.

First Personal Pronoun.

Full form.	Suffix.
Sing. Nom. <i>bo</i>	<i>s</i> or <i>m</i> .
Acc. <i>me</i>	<i>m</i> .
Instr. <i>me</i>	<i>m</i> .
Dat. <i>me</i>	<i>m</i> .

¹ Beames, Cp. Gr. i, 42.

Plur. Nom. <i>aśi</i>	}	wanting.
Acc. <i>āsi</i>		
Instr. <i>asi</i>		
Dat. <i>as</i>		

Second Personal Pronoun.

Sing. Nom.	<i>tsa</i>	<i>h</i> (<i>k</i>).
Acc.	<i>tsa</i>	<i>t</i> .
Instr.	<i>tse</i>	<i>t</i> .
Dat.	<i>tse</i>	<i>y</i> .
Plur. Nom.	<i>toh</i> ¹	} <i>va</i> .
Acc.	<i>tohi</i>	
Instr.	<i>tohi</i>	
Dat.	<i>tohi</i>	

Third Personal Pronoun.

Sing. Nom.	<i>su</i> (masc.), <i>so</i> (fem.)	<i>n.</i>
Acc.	<i>su</i> , <i>so</i> ,	<i>n.</i>
Instr.	<i>tam</i> ⁱ	<i>n.</i>
Dat.	<i>tas</i>	<i>s.</i>
Plur. Nom.	<i>tim</i> (masc.) <i>tim</i> <i>a</i> (fem.)	} <i>h</i> (<i>k</i>).
Acc.	<i>tim</i> , <i>tim</i> <i>a</i> ,	
Instr.	<i>timan</i>	
Dat.	<i>timan</i>	

In the above, Dative forms are sometimes used instead of the Accusative; e.g., *bo chu-sa-y mārān tse*, 'I am-I-to-thee beating to thee,' instead of *bo chu-sa-t mārān tsa*, 'I am-I-thee beating thee,' i.e., I am beating thee. Here, in the first instance, the dative *tse*, and the dative suffix *y*, are used instead of the accusative *tsa*, and the accusative suffix *t*.

The suffix *h*, of the nominative singular, second person, and of the plural of the third person becomes *k* when at the end of a word. Thus *mōr^u-ha-s bo*, 'killed (*mōr^u*)-by them (*h*)-I(*s*) I,' 'They killed me;' but *mōru-k*, 'killed-by-them (*k*, not *h*),' 'they killed.'

In Kāçmīrī, these suffixes are used only with verbs, not with nouns.

The corresponding pronominal suffixes in the other languages of the North-Western Family are as follows:—

Western Pañjābī:¹—

FIRST PERS. Nom., Sing.:—*m* or *s*; e. g. *āya-m*, or *āyu-s* 'I came.'
Obl.:—*m*; e. g. *kitu-m* 'it was done by me,' 'I did.'

¹ The examples are taken from Mr. Bomford's Grammar, and from O'Brien's Multānī Glossary.

Examples of use; *Ishk tēdē dī gāl piyu-m gārī*, 'of thy love the snare has fallen-to-me (*dativus commodi*) upon the neck,' *i. e.*, 'has fallen on my neck;' *nazar āwi-m matan*, 'the sight (of him) may come-to-me perhaps,' 'perhaps I may see him;' *juta-m jōrā*, 'Was yoked-by-me the pair'; 'I yoked the pair'; *kharu-m*, 'I (was) standing.'

Nom. or Obl. Plur.:—*sē*; e. g. *ni-sē*, 'not-we'; *hā-sē*, 'We-were' (lit. was-we); *āyō-sē*, 'We came' (*āyō*, old form of *āyā*, 3rd pers. sing., 'came'); *kitō-sē*, 'it was done-by-us,' 'we did;' *Mēdhiā-wālī dā khiāl piō-sē*, 'of the girl with braids a fancy (*i. e.*, a fancy for the girl) has occurred-to-us.'

SECOND PERSON, Sing.; Nom.:—*vē* or *ō*; e. g., *hā-vē*, 'thou-wast;' *āy-ō*, 'thou-camest.'

Obl.:—*ēī* (dat. *ī*); e. g., *kit-ēī*, 'It was done-by-thee,' 'thou didst;' *āpnī bēri bōr dīt-ēī*, 'thy own boat was swamped-by-thee; *Allāh na ān-ēī*, 'may God not bring-to-thee; *ākhā-ī* (for *ākhā + ī*) 'let me say-to-thee.'

Plur.; Nom.:—*vē*; e. g., *āyō-ve*, 'ye-came;' *hā-vē*, 'ye-were;'

Obl.:—*vē* or *ō*; e. g., *kitō-vē*, 'it was done-by-you;' 'tars na āy-ō, 'did not pity come-to-you (*āyā + ō*);' *kiyā nā hē-vē*, 'what name is there-to-you,' 'what is your name;' *ni-vē* or *ni-vhē*, 'not-you.'

THIRD PERSON, Sing.; Nom.:—*s*; e. g., *māriu-s yār*, 'beaten-was-she by her beloved.'

Obl.:—*s*; *kitu-s*, 'it was done-by-him,' 'he did;' *bukhār hi-s* (*hē + s*), 'fever is-to-him,' 'he has fever;' 'kitu-s mōṭā, 'he has made-it fat;' *wanjan dēō-s*, 'let-him go.'

Plur.; Nom. not used;—Obl.:—*hē* with nasalization of preceding vowel, or *ni*; e. g., *kitō-hē*, 'it was done-by-them,' 'they did;' *yād āyō-hē*, 'remembrance came-to-them;' *khāsō-ni*, 'he will eat-them.'

It will be seen that, in W.-Pañjābī, these suffixes can be added to verbs, and to negatives. It is doubtful if they are used with Substantives. O'Brien says that they are so used, but Bomford has not met an instance. The series is complete except for the nominative of the third Person Plural.

Sindhī¹

First Pers., Sing., Nom.:—*se* or *me*; e. g., *haliu-se*, *I-went* (from *haliō*, gone, + *se*); Poet. *chaddiō-se*, 'I-was-given-up;' *chaddiā-ī-me*, 'I(me)-was-given-up-by-him(ī),' 'He gave me up.'

Obl.:—*me*; e. g., *piu-me*, 'my-father;' *nuku-me*, 'my daughter-in-law;' *chhaddiu-me*, 'given-up-by-me,' 'I gave up;' *chaddiō-mā-e*, 'thou-wast-given-up-by-me,' 'I gave thee up,' (here *e* is the nominative suffix of the Second Pers. Sing., and *mā* is a strengthened form of *me*); *atha-me*, 'there-is-to-me' 'est mihi.'

¹ Examples from Trumpp.

Plur., Nom :—*sĩ*, e.g., *haliā-sĩ*, ‘we-went’; *chaddiā-sĩ*, ‘we-were-given-up.’

Obl. :—*ũ* or *hũ* (or sometimes *sũ*), not used with nouns: with verbs,—e.g., *chaddiō-sũ*, ‘given-up-by-us,’ ‘we gave up;’ *ath-ũ*, ‘there-is-to-us;’ *chaddiō-sũ-e*, ‘thou-wast-given-up-by-us,’ ‘we gave thee up.’

SECOND PERS., Sing.; Nom. :—*ẽ*, *e*; e.g., *hali-ẽ*, (for *haliu-ẽ*) ‘thou-wentest;’ *diṭh-ẽ* (for *diṭhō + ẽ*), ‘thou-wast-seen;’ *chaddi-ẽ*, ‘thou-wast-given-up;’ *chaddiā-ĩ-e*, ‘thou-wast-given-up-by-him,’ ‘he gave thee up.’

Obl. :—*e* (in one case *-ēi*); e.g.; *piu-e*, ‘thy-father;’ *nuhu-e*, ‘thy-daughter-in-law;’ *āhiyā-e*, or *ath-ēi*, ‘there-is-to-thee;’ *chaddyu-e*, ‘thou-gavest-up’ (lit., ‘given-up-by-thee’); Double suffixes are not used with the Second Pers., Obl.

Plur.; Nom. :—*u* or *va*; e.g., *halya-u* (for *haliā + u*), ‘you-went;’ *chaddyu-u*, ‘you-were-given-up;’ *chaddiā-ĩ-va*, ‘you-were-given-up-by him,’ ‘he gave you up.’

Obl. :—*va*; e.g., *piu-va*, ‘your-father;’ *nuhu-va*, ‘your-daughter-in-law;’ *atha-va*, ‘there-is-to-you;’ *chaddyu-va*, ‘you-gave-up;’ (lit. ‘given-up-by-you.’)

THIRD PERS., Sing.; Nom. :—ordinarily not used, but sometimes *se*; e.g., *chaddiā-ĩ-se*, ‘He (*se*)-was-given-up-by-him.’

Obl. :—This has two forms, one for the instrumental, *ĩ*, and one for the other Obl. cases, *si*; e.g., instr., *chaddiā-ĩ*, ‘he gave up,’ (lit. ‘given-up-by-him’); other Obl. cases;—*piu-se*, his-father; *nuhu-se*, his-daughter-in-law; *atha-se*, ‘there-is-to-him’; *ḍḍinā-ĩ-se*, ‘it-was-given by-him (*ĩ*, instr.)-to-him (*se*, dat.),’ i.e., he gave to him.

Plur.; Nom. :—Ordinarily not used, but sometimes *ne*; e.g., *chaddiā-ĩ-ne*, *they(ne)*-were-left-by-him (*ĩ*).

Obl. :—two forms, as in Singular: instr., *ũ*, ;—e.g., *chaddiā-ũ*, ‘they left’ (lit. ‘it-was-left-by-them’); Other Obl.—cases, *ne*; e.g., *piu-ne*, ‘their-father;’ *nuhu-ne*, ‘their-daughter-in-law;’ *atha-ne*, ‘there-is-to them;’ *ciā-ĩ-ne*, ‘it-was-said-by-her (*ĩ*)-to-them (*ne*),’ ‘she said to them.’

It will thus be seen that there is a nearly complete series of these Pronominal suffixes in Sindhī; only those for the nominative of the third person are wanting, and, even in this case, as in all other cases, the oblique forms can be used for the nominative. All suffixes can be used for both nouns and verbs except that of the first Pers., Pl. Obl., which is only used with verbs. They can (although no examples are given above) also be used with adverbs and postpositions.

We are thus enabled to draw up the following table of Pronominal suffixes as used in the North-Western family of languages :—

	KĀÇMĪRĪ.		W. PAÑJĀBĪ.		SINDHĪ.	
	Full Pro-noun.	Suffix.	Full Pro-noun.	Suffix.	Full Pro-noun.	Suffix.
1st Person.						
Sing. Dir. ...	<i>bo</i>	<i>m or s</i>	<i>maĩ</i>	<i>m or s</i>	<i>āũ</i>	<i>se or me</i>
Obl. ...	<i>me</i>	<i>m</i>	<i>mai</i>	<i>m'</i>	<i>mũhũ</i>	<i>me</i>
Plur. Dir. ...	<i>aṣi</i>	—	<i>assā</i>	<i>sē</i>	<i>aṣĩ</i>	<i>sĩ sũ</i>
Obl. ...	<i>asi</i>	—	<i>assā</i>	<i>sē</i>	<i>aṣā</i>	<i>ũ, sũ</i>
2nd Person.						
Sing. Dir. ...	<i>tsa</i>	<i>h</i>	<i>tũ</i>	<i>vē or ō</i>	<i>tũ</i>	<i>ē, e</i>
Obl. ...	<i>tse</i>	<i>t (dat. y)</i>	<i>tai</i>	<i>ēi (dat. ī)</i>	<i>tō</i>	<i>e (ēi)</i>
Plur. Dir. ...	<i>tohi</i>	<i>va</i>	<i>tussā</i>	<i>vē</i>	<i>ṭavhĩ</i>	<i>u, va</i>
Obl. ...	<i>tohi</i>	<i>va</i>	<i>tussā</i>	<i>vē or o</i>	<i>ṭavhā</i>	<i>va</i>
3rd Person.						
Sing. Dir. Masc.	<i>su</i>	<i>n</i>	<i>ũ , sō</i>	<i>s</i>	<i>ũ, sō</i>	—(se)
Obl. „	Instr. <i>ṭami</i> , dat. <i>tas</i>	<i>n (dat. s)</i>	<i>ũ , taĩ</i>	<i>s</i>	<i>una, tāhē</i>	<i>se (instr., i)</i>
Plur. Dir. „	<i>tim</i>	<i>h</i>	<i>ũ , sō</i>	—	<i>hũ, sē</i>	—(ne)
Obl. „	Instr. <i>timau</i>	<i>h</i>	<i>ũhā, tinhā ~ hē or ni</i>		<i>hune, tane</i>	<i>ne (instr. ũ)</i>

We now proceed to consider the origin of these Pronominal suffixes.

First Person.—The Sanskrit Enclitic pronouns of the First Person are, as already stated; sg., acc., *mā*, dat. gen., *mē*; pl. acc., dat. gen. *nas*. These become in standard Prakrit sg. *maṁ*, *mē*; Pl. *nō*. From the singular we get the suffix *m* or *me*. It is well known that oblique forms are generally to be referred to a Prakrit genitive, and that there is a common tendency observable in all Indo-Aryan Vernaculars, for the oblique form to usurp the functions of the direct form. We have just noticed that this is at the present day, the case in Sindhī. The form in *s* or *se* is evidently borrowed from the plural, also a commonplace of Indian philology. The Sanskrit *nas*, cannot account for the plural forms. The reason for the abandonment of this enclitic, is probably to avoid confusions with the *n* of the third person. It is evident that the forms *sē*, *sĩ*, *sũ*, are based on the corresponding full forms of the Pronouns. Hoernle,¹ no doubt correctly, accounts for these full forms, by referring them to the Sanskrit *asmad*, through a Prakrit oblique **assahĩ*, *assaĩ*, or **aṁsahĩ*.² The form *sũ*, may be either derived from a Prakrit **assahũ*, or the *u* may be due to the *m* of *asmad*, through a form **asumahĩ*, *asuvāhĩ*, hence *aṣũ*, *sũ*. According to Brugmann (*Grundriss*, ii, 803), *asmad* was originally itself a plural, though used as a singular in Sanskrit. A by-form of the Sindhī *ũ*, is *hũ*, and this points to the

¹ Gd., Gr. p. 280. ² Cf. H. C. iii, 59, 60; where *sm* of the loc., becomes *ss*.

Apabhraṃça Genitive Pl. *amhahā*, of which it is a much abraded form : H. C. iv, 397, allows a non-initial non-conjunct *m* to become a nasalized *v*. In *mh* the *m* is certainly compound, but such compounds with *h* are usually treated as single letters, not lengthening a preceding vowel by position, so that *mh* is treated as the aspirate of *m*, just as *dh* is the aspirate of *d*. This is of every day occurrence in the modern vernaculars. We may therefore assume a form **avhāhā*, from which the transition to *hvāhā*, *hāū*, *hū* and *ū* is simple.

Second Person.—The Sanskrit Enclitics are, Sg., acc. *tvā*, dat. gen. *tē* ; Pl., acc. dat. gen., *vas*. The corresponding Prakrit forms are, Sg. *tē* ; Pl. *vō*. The Kāçmīrī obl. form in *t* speaks for itself. It is the Sanskrit Prakrit *tē*. The Kāçmīrī *h* is of doubtful origin. Grammarians give the Kāçmīrī suffix as *k*, and say that, when not the final letter of a word, it becomes *h*. It is, no doubt, true that there is a tendency for a medial *k* to become *h*, but that would leave the existence of the *k* unaccounted for, nor do I know any Sanskrit or Prakrit form of the second personal pronoun from which it could be derived. On the other hand, if we take *h* as the original form, there is no difficulty in finding an original in Prakrit, and there is no inherent impossibility in a final *h* becoming *k*. A final *h*, unvocalised, does regularly become *k* in Sanskrit, but I must confess that I have not met any other example of the change in the modern Indo Aryan Vernaculars. Assuming, therefore, that *h* is the original form, it must be derived, not from the Sanskrit enclitics, but from the Prakrit *bhē* or *uyhē* (Cf. W. Pañjābī *ni-vhē*), the plural form, corresponding to the Sanskrit *yūyam*.¹ If *k* is the original form, I am, at present, unable to suggest any derivation. We next come to the forms, *vē*, *ō*, *ē* (direct), *ēi*, *e* (oblique), and (Western Pañjābī) *ī* and (Kāçmīrī) *y* (dative). Trumpp² derives these from the Skr.-Pr., enclitic *tē*, assuming that the *t* has been elided, and the *ē* has remained. I am, however, unable to admit this derivation as correct. In the first place, it would not account for the *v* in *vē* ; in the second place, it would be contrary to the analogy of the other Pronominal Enclitics. Accordingly to analogy, it is the *ē* not the *t* which should be elided, and the *t* not the *ē* which should remain. This has actually occurred in Kāçmīrī. It is much simpler to derive these forms from the Prakrit *bhē* or *uyhē* already mentioned, or rather from their instrumentals *bhēhī*, *ubbhēhī*, *umhēhī* or *uyhēhī*.³ The plural suffixes of this pronoun, *va*, *vē*, *ō*, or *u*, present, no difficulty. They are all plainly derived from the Skr.-Pr. enclitic *vas*, *vō*.

Third Person. There is in Sanskrit a partially declined enclitic pronoun of the second person, having *ēna* for its base. This becomes in

¹ H. C. iii, 91.² S. Gr., 225.³ H. C. iii, 95.

Prākṛit *ṇa*,¹ which is the origin of the Kāçmīrī *n*, while from its instrumental plural *ṇēhṣ* is derived the Western Pañjābī *ni* and the Sindhī *ne*. The other suffixes of the third person must be sought for elsewhere. Kāçmīrī *s* (dat.), W.-Pañjābī *s*, Sindhī *se*, are derived from the Sanskrit *asya* (not enclitic), through the Prakrit *sē*.² In Prakrit the Genitive performs the functions of the dative. According to the analogy of *mē* and *tē*, the Prakrit *sē* was probably an enclitic. Trumpp³ derives the instrumental terminations *ṣ* and *ū* from the Sindhī *ina*, 'by him,' and *une* 'by them.' This is not impossible. We may however, derive them directly from the original Apabhraṃçā forms **avaṇahṣ*, **avaṇahū*;⁴ or from the Ap. *āyahṣ*, *āyahū*, 'by these.'⁵ There remain the Kāçmīrī forms in *h*, and the W.-Pañjābī in *hē*. The latter must have sprung from a form *nhē*, which I refer to the Prakrit instrumental plural *ṇēhṣ*, just quoted. The Kāçmīrī *h* is weakened from *hē*, and, as in the case of the second person, it becomes *k* at the end of a word.

It will be an interesting task, to trace what other Indo-Aryan Vernaculars preserve traces of this use of Pronominal suffixes. Taking first the languages of High Asia in the neighbourhood of Kashmir, the only language which uses these forms in the Turkī dialect, Ghalchah. It, however, is not Aryan. The languages connected with Kāçmīrī, viz., Shina (of Gilgit), Torwalik (of the Swat Valley), Bushkarik (of the Swat and Panjkora Valleys), Chiliss (of Chilās), and Burishki, do not, so far as I can find, use them. Burishki, the language of the Hunza and Nagar Hills uses Pronominal *prefixes*, but it is doubtful whether it is an Aryan language at all. Turning to India Proper, I have already said that not one of the Dravidian languages uses Pronominal suffixes, but that Santālī uses them with the greatest freedom. Of the Aryan languages, they are unknown to all except to those of the East and South of India, in which a number of curious phenomena can only be explained by the forms in use in Kashmīr, Sindh, and the Western Panjab, more than a thousand miles away.

As regards **Nouns**, we find remains of pronominal suffixes in the extreme East India. For instance in Assamese, *bāp*, means 'father,' but 'my father' is *bāpāi*, thy father is *bāpā*, and his father is *bāpek*. These are the same suffixes that we have already dealt with, in dealing with other languages, and we need not discuss their derivation.

As regards **Verbs**, in Kāçmīrī, the Pronominal suffixes are in different stages of agglutination, if I may use the expression. Those for the first and third persons may or may not be used. If a Kāçmīrī wishes to say 'I killed.' He may say either *me mōr*^u 'by me was killed,' or he may say *me moru-m*, 'by me was-killed-by-me.' For 'they killed,' he may

¹ H. C. iii, 70, 78.² H. C. iii, 81.³ S. Gr. 345.⁴ Hoernle, Gd., Gr., p. 292.⁵ H. C. iv, 365.

say either *timau mōr^u*, or *mōru-k*. But for ‘you killed,’ he must say *tohi mor^uva*, by you was-killed-by-you;’ He cannot say *tohi mor^u*. While, therefore, the suffixes of the first and third persons, are purely agglutinative, those for the second have become terminations inseparable from the verb. The verb in this instance is not in the agglutinative, but in the new synthetic stage of the language, which is just beginning to develop. In Bihārī (one of the Eastern Family of languages), a great number of verbal terminations end in *ai*; and it is a curious fact that whenever the near or remote object of the verb is in the second person, this *ai*, in the Maithilī dialect especially becomes *au*. Thus, a Tirhutiyā says *ham ok’rā kē mār’liai*, ‘I killed him,’ but *ham toh’rā kē mar’liau* ‘I killed you.’ Here the *au* is evidently an abraded form of this North-Western *va*; and the phrase means literally, ‘I you killed-you.’ Again a Tirhutiyā says, *ok’ra gārī mō kī māl chai*, ‘in his cart what property is there;’ but *toh’rā gārī mō kī māl chau*, ‘in your cart what property is-there-to-you,’ in which *chau*, corresponds to the Kāçmīrī *chu-va*, or to the Western-Pañjābī *hē-vē*, or to the Sindhī *atha-va*, ‘there is-to-you,’ ‘you have.’

We may, however, go much further than this. It can be proved that the conjugation of the past tense of transitive verbs of the eastern languages of India, although now active was originally passive. Thus, the Bangālī *mārilām*, means ‘I killed,’ but it must originally have meant ‘killed by me,’ *mārila-am*, in which the *am* is a Pronominal suffix, equivalent to the *m* of the Kāçmīrī *mōru-m*, and has nothing whatever to do with the Sanskrit and Prākṛit personal endings with which they have been usually connected. This becomes plain when we compare the past tense of the cognate Maithilī verb. In its simplest form this tense is conjugated as follows in the masculine:

Singular.	Plural.
1. <i>māral-ahū</i>	<i>māral-ī</i> .
2. <i>māral-ē</i>	<i>māral-āh</i> (old <i>-ahu</i>).
3. <i>māral-ak</i>	<i>māral-(a)nh¹</i> .

The corresponding forms of the future, are—

Singular.	Plural.
1. <i>mārab-ahū</i>	<i>mārab-ī</i> . ²
2. <i>mārab-ē</i>	<i>mārab-āh</i> .
3. <i>mārat</i>	<i>mārat-āh</i> .

¹ The Maithilī verb does not distinguish between Singular and Plural,—only between honorific and non-honorific. The above arrangement, therefore, slightly differs from that of my Maithilī grammar. The Singular and Plural forms have been classed according to origin.

² This form is not used now-a-days in Maithilī, but must have existed. It is used in other Bihārī dialects.

The terminations of the Conjunctive Present, (Old Present Indicative) which is formed directly from the old Skr.-Pr. Present Indicative, without the aid of suffixes are—

- | | |
|------------------------------|------------------------------|
| 1. <i>mārū</i> ¹ | <i>mārī</i> |
| 2. <i>mārai</i> ¹ | <i>mārāh.</i> |
| 3. <i>mārai</i> ² | <i>mārath</i> ⁱ . |

Taking these three tenses we note that the Past and Future are participial tenses; *i.e.*, Participles, with Maithilī terminations added to them; while the Old Present (which I shall call Present for shortness) is a synthetic tense with the old Skr.-Pr. terminations.

It is commonly said that the Participial tenses are conjugated by taking a participle (*māral* or *mārab*) and appending to it the terminations of the present, but a comparison of the forms given above will show that this is not the case. The terminations of the Past and of the Future, are *not* the same as those of the Present, except in the first person and second persons plural.

In the Future, the terminations of the first and second persons are pronominal suffixes in the indirect form, added to the future passive participle; just as Kāçmīrī has *mōru-m*, 'killed-by-me,' for 'I killed,' so Maithilī has *mārab-ahū* 'it is to be killed by me,' 'I shall kill.' The first person singular termination corresponds to the Ap. Pr., *amhahā*, as already explained. The *ī* of the first person Plural may be referred to the Pr. Instr. Pl. *amhē* or *bhē* (H. C. iii, 110). The *ē* of the second singular, occurs in Sindhī and has been already discussed. It, also, is an oblique form. The termination *āh* of the second singular necessarily refers us to an older form *ahu*, which is formed from the North-Western *va*, through *au*, *a(h)u*. The Future third person is formed from the Present Participle *active*, and therefore, if it takes any termination, takes the *direct* form of the pronominal suffixes. As in the case of all tenses formed from *active* participles, its simplest form takes no termination in the singular, while in the plural, it, perhaps, takes a direct form of the third personal pronoun. We note the same fact in the third person of the past of neuter verbs which is similarly formed from an *active* past participle. Thus *calal* 'he went,' *calalāh* 'they went'; but we never meet it in the case of the past tense of transitive verbs, formed from the *passive* past participle. We cannot say *māral*, 'he killed,' or *māralāh* 'they killed.' With regard to the termination *āh*, the *ā* is written आ *ā*, and is pronounced something like the *ä* in the English word *hät*. It scans short in poetry, though written long. It may be the Sanskrit pronoun of the third person *adas*, nominative *asau*,

¹ Obsolete in Maithilī.

² Exists, but rare.

or, in Prakrit *aha*,¹ but it is, more probably, merely an old nominative plural termination of the participle, agreeing in gender and number with its subject. Its feminine is *īh*, thus *māratīh*, 'they (fem.) will kill,' *sutalīh*. 'they (fem.) slept.'

In the third person of the Past tense of transitive verbs, we see clearly the passive nature of the conjugation. The termination *nhⁱ* of the third person plural, as in the case of the corresponding forms of the North-West, is derived from the Prakrit instrumental plural *ñēhī*; hence *māral-(a)nhⁱ* means 'killed by them.' The *k* of the third person singular, I am not able to derive in a way satisfactory to myself, as I have elsewhere stated; but it is evidently a pronominal suffix of the third person with an instrumental power, and is the same as the Kāçmīrī corresponding termination *h* (*k*).

We have not by any means exhausted the wild maze of forms, which is presented by the Maithilī verb. I have described above how the termination *ai* becomes *au*. We are now in a position to trace the origin of this termination *ai*, which can be added optionally to almost every form of the verb. It is merely the pronominal suffix of the third person, referring to the object. It is said that it can be used also when the first person is the object. I do not remember having met any instance of this, but in the nature of things such an occurrence must be comparatively rare, and the use of the termination could easily have extended to the first person, once its original meaning was lost sight of. There are numerous Prakrit pronominal forms to which it can be referred. Perhaps the simplest would be to consider it, either as *āya*, the Ap. Pr., nom. sg. of *idam*, 'this,' or as the oblique form *ahahī* of *aha* (*adas*), 'that.' We can then explain *māral'kai* (an optional form of *māral-ak*) by *māral + k + ai*, i. e., he (*ai*) was killed (*māral*) by him (*k*): exactly equivalent to the Kāçmīrī *mor^u-h(a)-n*, he (*n*) was killed (*mōr^u*) by them (*h*, i. e., *k*). This *k* can again be superadded to these forms. At the present day it appears to be merely pleonastic, as in such a phrase as *māral-'kaik* (*māral + k + ai + k*), but sometimes its original force remains, as in *mār'liauk* (i. e., *māral + ī + au + k*), which means 'I killed him for you,' literally 'he (*k*) was killed (*māral*) by me (*ī*) for you (*au*).'

Another use of the termination *nhⁱ* already described may be noticed. It may be added to almost any form of the verb to attribute respect to the object. Thus, a Tirhutiya says, *ham ok'rā kē dekh'liai*, 'I saw him,' but *ham rājā kē dekh'liai-nhⁱ*, 'I saw (His Majesty) the King.' Here the *nhⁱ* is simply a plural of respect, and the sentence means literally 'I saw-them, the king.' So again he says *Hē rājā, ham*

¹ H. C. iii, 87. Cf. iv, 362, *ēhō* for *ēṣah*, in Ap. Pr.

ahā kē dekh'li-aunhī, 'O King, I saw Your Honour,' literally, 'O King, I to Your Honour saw-you-them, *i.e.*, Your Respected Honour.'

As regards verbal forms, all the cognate forms of the Eastern Family of Indo-Aryan Vernaculars can be similarly explained, and I may claim to have shown a very close connexion, between the modern languages of the East of India, and those of the North-West, at least as regards one particular grammatical point.

I reserve for another occasion, the question of the general relationship which exists between these two families of languages.

On the Radical and Participial tenses of the modern Indo-Aryan Languages.
—By G. A. GRIERSON, PH.D., C.I.E.

[Read January, 1896.]

In a paper which I had the honour of reading before the Society at the last meeting, I discussed the question of Pronominal suffixes, and their use in the conjugation of verbs in the Kāçmīrī Language. I also compared Kāçmīrī, in this respect, with the two other languages of the Indian North-Western family, *viz.*, Sindhī and Western Pañjābī, and with the Maithilī dialect of Bihārī, and with Assamese,—languages belonging to the Eastern family.

In the present paper, I propose to carry this enquiry a step further, and to ascertain how far the use of pronominal suffixes has obtained in the case of verbs of other Indo-Aryan Vernaculars.

In my former paper, I showed that these languages should be classed in three families,—a North-Western, a Central and an Eastern, the last including, as a sub-division, the Southern Marāṭhī with its Kōnkanī dialect. I also explained the difference between an analytic, an agglutinative, and a synthetic language, and I believe that the result of this paper (amongst other things) will be to show, that it may be taken as a broad rule, that while the Central Vernaculars prefer an Analytic, the North-Western, Eastern and Southern prefer an Agglutinative, or (its further developed form) a Synthetic system of conjugation.

In all these languages, the tenses of the verb may be divided into three groups, *viz.*, (1) the Radical tenses, (2) the Participial, and (3) the Periphrastic. The last, as not being necessary for our immediate purpose, may be dismissed without further notice, beyond explaining that they are compound tenses formed by adding auxiliary verbs to participles or to other tenses, as in the Hindī *gayā hai*, ‘he has gone,’ formed by adding the auxiliary verb *hai*, ‘is’ to the past participle *gayā*, ‘gone.’ So also the Sindhī *haliō āhē* (*haliō*, ‘gone,’ + *āhē*, ‘is,’) and the Bengali *giyāchē* (*giyā*, ‘gone,’ + *āchē*, ‘is’). Again, the Hindī future is a periphrastic tense; thus *jāūgā*, ‘I will go,’ lit., ‘I am gone’ (*gā*, auxiliary verb) ‘that I may go’ (*jāū*, radical tense); and the Western-Pañjābī present *jān’dā*,

‘I am going,’ compounded of the Participle *jān’dā*, ‘going,’ plus the auxiliary verb *hā*, ‘I am.’

Radical tenses are those which are derived throughout from a corresponding Sanskrit-Prakrit tense. That is to say, which are actual survivals of the old Sanskrit conjugation. The only Sanskrit-Prakrit tenses which have survived are the Present (including the Imperative), and the Future.

The following are the Sanskrit-Prakrit forms of the Present tense, the verb taken as an example being the ✓ *cal*, ‘go.’

		SANSKRIT.	PRĀKRIT.	APABHRAṂṢA. (Optional.)
Singular	1	<i>calāmi</i>	<i>calāmi (calami)</i>	<i>calaũ.</i>
„	2	<i>calasi</i>	<i>calasi</i>	<i>calahi, calai.</i>
„	3	<i>calati</i>	<i>calai</i>	<i>calahi, calai.</i>
Plural	1	<i>calāmas</i>	<i>calamō (calimō)</i>	<i>calahũ (*calihũ.)</i>
„	2	<i>calatha</i>	<i>calaha</i>	<i>calahu.</i>
„	3	<i>calanti</i>	<i>calanti</i>	<i>calahĩ (*calaĩ.)</i>

We shall now compare the existing form of the corresponding tenses in all the Indo-Aryan Vernaculars.

CENTRAL FAMILY.

		EASTERN PAÑJĀBĪ.	GUJARĀTĪ.	RAJPUTĀNĪ.	HINDĪ (BRAJ.)	CENTRAL PAHĀRĪ.	NAIPĀLĪ.
Sing.	1	<i>calāũ</i>	<i>cālũ</i>	<i>calaũ</i>	<i>calaũ</i>	<i>calũ</i>	<i>calũ.</i>
„	2	<i>calē</i>	<i>cālē</i>	<i>calai</i>	<i>calai</i>	<i>calĩ</i>	<i>calē.</i>
„	3	<i>calē</i>	<i>cālē</i>	<i>calai</i>	<i>calai</i>	<i>cal</i>	<i>calē.</i>
Plur.	1	<i>caliē</i>	<i>cālīe</i>	<i>calāũ</i>	<i>calaĩ</i>	<i>calaũ</i>	<i>calē.</i>
„	2	<i>calō</i>	<i>cālō</i>	<i>calō</i>	<i>calau</i>	<i>calā</i>	<i>calau.</i>
„	3	<i>calan</i>	<i>cālē</i>	<i>calai</i>	<i>calaĩ</i>	<i>calan</i>	<i>calun.</i>

In all the above, the tense has in modern times gained a conditional power, and is more commonly used as a Present Subjunctive.

NORTH-WESTERN FAMILY.

		SINDHĪ.	WESTERN PAÑJĀBĪ.	KĀÇMĪRĪ.
Sing.	1	<i>calā̃</i>	<i>calā̃</i>	<i>tsala</i>
„	2	<i>calē</i>	<i>calē</i>	<i>(tsala-k)</i> ¹
„	3	<i>calē</i>	<i>calē</i>	<i>tsali</i>
Plur.	1	<i>calū̃</i>	<i>calū̃</i>	<i>tsalan</i>
„	2	<i>calō</i>	<i>calō</i>	<i>tsaliu</i>
„	3	<i>calane</i>	<i>calin</i>	<i>tsalan</i>

In this, the Kāçmīrī form has gained the force of a Future. The other languages give it a Subjunctive force.

EASTERN FAMILY.

EASTERN GROUP.

		BAISWĀRĪ.	BIHĀRĪ (MAITHILĪ).	ASSAMESE.	BENGALI.	ORİYĀ.
Sing.	1	<i>calaū̃</i>	<i>calū̃</i>	<i>calō̃</i>	—	<i>cali</i>
„	2	<i>calai</i>	not used	<i>cala</i>	<i>calis</i>	<i>calu</i>
„	3	<i>calai</i>	<i>calai</i>	<i>calē</i>	<i>calē</i> <i>(calu-k)</i> ²	<i>calai</i>
Plur.	1	<i>calaž</i>	<i>calī</i>	singular form used.	<i>cali</i>	<i>calū̃</i>
„	2	<i>calahu</i>	<i>calāh</i> ³	<i>calā</i>	<i>cala</i>	<i>cala</i>
„	3	<i>calaž</i>	<i>calath</i> ⁱ	singular form used.	<i>calen</i>	<i>calanti</i>

¹ A late agglutinative form.

² A form with the pronominal suffix *k*, only used in the imperative.

³ *ā* pronounced something like the *a* in 'ball.'

SOUTHERN GROUP.

		MARĀṬHĪ.	KŌNKANĪ.
Sing.	1	<i>cālē</i>	<i>cālun</i>
„	2	<i>cālēs</i>	<i>cāl'çī</i>
„	3	<i>cālē</i>	<i>cālat</i>
Plur.	1	<i>cālñ</i>	<i>cālū</i>
„	2	<i>cālā</i>	<i>cāl'çat</i>
„	3	<i>cālat</i>	<i>cāltit</i>

In Marāṭhī, this tense has acquired the force of a Habitual Past, 'I used to go.' In Kōnkanī it is a Contingent Future, 'I may perhaps go.'

It is thus manifest that in every modern Indo-Aryan language there is a tense derived direct from the Sanskrit-Prakrit present. Sometimes Singular forms are used for Plural, and *vice versa*. The terminations are corruptions of the original Sanskrit-Prakrit terminations, and (with the exception of one or two sporadic forms) nothing has been added to these terminations in the way of pronominal suffixes. It is a genuine synthetic tense by origin.

We now come to the **Future**. The Sanskrit-Prakrit terminations are as follows :—

		SANSKRIT.	PRAKRIT.	APABHRAṂṢA. (Optional.)
Singular	1	<i>caliṣyāmi</i>	<i>calissāmi</i> or <i>calihimi</i>	<i>calissaũ</i> or <i>calihiũ</i>
„	2	<i>caliṣyasi</i>	<i>calissasi</i> or <i>calihisi</i>	<i>calissahi</i> , <i>calissai</i> or <i>calihihi</i> , <i>calihii</i>
„	3	<i>caliṣyati</i>	<i>calissai</i> or <i>calihii</i>	<i>calissahi</i> , <i>calissai</i> or <i>calihihi</i> , <i>calihii</i> .
Plural	1	<i>caliṣyāmas</i>	<i>calissāmō</i> or <i>calihimō</i>	<i>calissahũ</i> or <i>calihihũ</i> , (* <i>calihiũ</i>).
„	2	<i>caliṣyatha</i>	<i>calissaha</i> or <i>calihiha</i>	<i>calissahu</i> or <i>calihihu</i> , (* <i>calihiu</i>).
„	3	<i>caliṣyanti</i>	<i>calissanti</i> or <i>calihinti</i>	<i>calissahĩ</i> (* <i>calissaĩ</i>) or <i>calihihĩ</i> (* <i>calihĩ</i>).

This future has not survived, as a Radical tense in all Indo-Aryan Vernaculars, as will be seen from the following:—

CENTRAL FAMILY.

	EASTERN PAÑJĀBĪ.	GUJARĀTĪ.	RĀJPUTĀNĪ (Optional.)	HINDĪ (BRAJ.) (Optional.)	CENTRAL PAHĀRĪ.	NAIPĀLĪ.
Sing. 1	wanting.	<i>cālīç</i>	<i>calahũ</i>	<i>calihaũ</i>	wanting.	wanting.
„ 2		<i>cālīçē</i>	<i>calahī</i>	<i>calihai</i>		
„ 3		<i>cālīçē</i>	<i>calahī</i>	<i>calihai</i>		
Plur. 1		<i>cālīçũ</i>	<i>calahã</i>	<i>calihaĩ</i>		
„ 2		<i>cālīçō</i>	<i>calahō</i>	<i>calihau</i>		
„ 3		<i>cal'çē</i>	<i>calahī</i>	<i>calihaĩ</i>		

In Rājputānī and Hindī, the future can also be made periphrastically, e.g., H. *calaũ-gau*, 'I shall go,' *lit.*, 'I am gone that I may go.' In Eastern Panjābī, Central Pahārī, and Naipālī, a Periphrastic Future is the only one used.

NORTH-WESTERN FAMILY.

	SINDHĪ.	WESTERN PAÑJĀBĪ.	KĀÇMĪRĪ.
Sing. 1	wanting.	<i>cal'sā</i>	wanting.
„ 2		<i>cal'sē</i>	
„ 3		<i>cal'sī</i>	
Plur. 1		<i>cal'sũ</i>	
„ 2		<i>cal'sō</i>	
„ 3		<i>cal'sin</i>	

In Sindhī, a Periphrastic Future is used. In Kāçmīrī, the old Present is used as a Future.

EASTERN FAMILY.

EASTERN GROUP.

		BAISWĀRĪ (Optional).	BIHĀRĪ (MAITHILĪ).	ASSAMESE.	BENGALI.	ORİYĀ,
Sing.	1	<i>calihaũ</i>				
	2	<i>calihahi</i>				
	3	<i>calihahi</i>	wanting.	wanting.	wanting.	wanting.
Plur.	1	<i>calihahĩ</i>				
	2	<i>calihahu</i>				
	3	<i>calihahĩ</i>				

In Baiswārī (the old language of Tul'sī Dās is taken as the type) a periphrastic form is also used. In the other languages, the Future is a Participial Tense.

SOUTHERN GROUP.

Both Marāṭhī and Kōnkanī have a Periphrastic Future, and no remains of the old Sanskrit-Prakrit tense appear.

With regard to the Sanskrit-Prakrit Future, therefore, the remarks apply which we have made regarding the Present, but in a modified form. The tense has survived only in Gujarātī, Rājputānī, Hindī, Western Pañjābī, and Baiswārī. In these languages it is a Radical Tense. In Eastern Pañjābī, Central Pahārī, Naipālī, Sindhī, and Marāṭhī (with its Kōnkanī dialect), the Future is a Periphrastic tense, and need not concern us further. Kāçmīrī has the Future as a Radical Tense, but has borrowed the old Sanskrit Present for the purpose. In the true Eastern languages, Bihārī, Assamese, Bengali and Oriyā, the Future is a Participial tense, and will require subsequent further examination.

Except the Imperative, which closely resembles the Old Present, and need not be specially considered, there are no other Radical tenses in the modern Indo-Aryan Vernaculars.

We now come to the **Participial Tenses**. A modern Indo-Aryan participial tense is not directly derived from any tense in Sanskrit or Prakrit. It is simply a modern participle to which the function of a

tense is given. Pronominal suffixes may or may not be added to it. Thus, to take the root *cal*, to go. In Hindī (Braj) its Past Participle is *calyau*, 'gone,' and to this is given the function of a past tense, and it is also used to mean 'I,' 'thou,' or 'he went,' without the addition of any suffix to show what person is referred to. On the other hand, in Kāçmīrī, the Past Participle is *tsol^u*, 'gone,' and when the function of a past tense is given to it, pronominal suffixes in the nominative case are added to it, to indicate the person who is gone; thus, *tsolu-s*, 'I went,' lit. 'gone-I,' *tsolu-k*, 'thou wentest,' lit. 'gone-thou.' If the subject of the verb is feminine or plural, or both, then the participle, being an adjective, is altered to agree with the subject. Thus, the plural masculine of the Hindī *calyau*, is *calē*, and *calē* is used as a participial tense, to mean 'we,' 'you,' or 'they went' (masculine). So the masculine plural of the Kāçmīrī *tsol^u* is *tsaliⁱ*, and when the participle is used as a participial tense, with the subject in the masculine plural, this form is used, as in *tsaliⁱ-və*, 'you went,' in which *və* is the pronominal suffix of the second person plural in the nominative case.

It has hitherto been assumed that these terminations, added by some languages, and which I call pronominal suffixes, are merely the old Sanskrit-Prakrit terminations of the old Present, borrowed for the purpose (possibly under the influence of false analogy), and tacked on to these modern participles. *Primâ facie*, the addition of an old Prakrit termination to a modern form—so that the two form one synthetic word—is not probable. In the second place, it will be seen that they are not the same as the terminations of the old Sanskrit-Prakrit present. Thirdly, we have the evidence of some languages that these terminations are (at least in them) agglutinative pronominal suffixes, which may be added or not as fancy seizes the speaker. For these reasons I believe that I can show that all these terminations of participial tenses are pure pronominal suffixes added to participles, and are not the terminations of the Old Present borrowed for the occasion.

The Participles used in the formation of Participial tenses, are the Past, the Present, and the Future. We shall take them in order. Only Masculine forms, as a rule, will be given.

The following are examples of Tenses based on the **Past Participle**. They are all simple past tenses, and mean 'I,' 'thou,' 'he,' &c., 'went.'

CENTRAL FAMILY.

		EASTERN PAÑJĀBĪ.	GUJARĀTĪ.	RĀJPUTĀNĪ.	HINDĪ (BRAJ.)	CENTRAL PAHĀRĪ.	NAIPĀLĪ.
Past Participle.		<i>caliā</i>	<i>cālyō</i>	<i>calyō</i>	<i>calyāu</i>	<i>calē</i>	<i>calyō</i>
Singular	1	} <i>caliā</i>	<i>cālyō</i>	<i>calyō</i>	<i>calyau</i>	} <i>calē</i>	<i>caly-ē</i>
	2						<i>cali-īs</i>
	3						<i>calyō</i>
Plural	1	} <i>calē</i>	<i>cālyā</i>	<i>calyā</i>	<i>calyē</i>	} <i>calā</i>	<i>caly-aũ</i>
	2						<i>caly-au</i>
	3						<i>calyē</i>

Except Naipālī, all the above take feminine forms, to agree with a feminine subject.

NORTH-WESTERN FAMILY.

		SINDHĪ.	WESTERN PAÑJĀBĪ.	KĀÇMĪRĪ.
Past Participle.		Sg. <i>caliō</i> , fem. <i>calī</i>	<i>caliā</i>	Sg. <i>tsol^u</i> , fem. <i>tsalⁱ</i>
Sing.	1	<i>caliu-se</i> fem. <i>caliā-se</i>	<i>calia-s</i> or <i>calia-m</i>	<i>tsolu-s</i> , fem. <i>tsali-s</i>
	2	<i>cali-ē</i>	<i>cali-ā</i>	<i>tsolu-k</i> ; fem. <i>tsali-k</i>
	3	<i>caliō</i> fem. <i>calī</i>	<i>caliā</i>	<i>tsol^u</i> , fem. <i>tsalⁱ</i>
Plur.	1	<i>caliā-sī</i> fem. <i>caliū-sī</i>	<i>caliō-se</i>	<i>tsalⁱ</i> , fem. <i>tsali</i>
	2	<i>calia-u</i> fem. <i>caliū</i>	<i>caliō-hē</i>	<i>tsalⁱ-va</i> , fem. <i>tsali-va</i>
	3	<i>caliā</i> fem. <i>caliū</i>	<i>calē</i>	<i>tsalⁱ</i> , fem. <i>tsali</i>

In Western Pañjābī, there is no change for gender.

EASTERN FAMILY.

EASTERN GROUP.

		BAISWĀRĪ.	BIHĀRĪ. (MAITHILĪ.)	ASSAMESE.	BENGALI.	ORIYĀ.
Past Participle.		<i>caleu</i> , fem. <i>caliu</i> .	<i>calal</i> , fem. <i>calalⁱ</i> .	* <i>calil</i> .	* <i>calila</i> .	* <i>calilā</i> .
Singular	1	<i>cale-ũ</i> fem. <i>cali-ũ</i>	<i>calal-ahũ</i>	<i>calil-ō</i>	<i>calin-u</i>	<i>calil-i</i>
	2	<i>cale-u</i> , fem. <i>cali-u</i>	<i>calal-ē</i>	<i>calil-i</i>	<i>calil-i</i>	<i>calil-u</i>
	3	<i>caleu</i> , fem. <i>caliu</i>	<i>calal</i> , fem. <i>calalⁱ</i>	<i>calil</i> or <i>calil-ē</i>	<i>calila</i> or <i>calil-ek</i>	<i>calilā</i>
Plural	1	<i>cale-nhi</i> , fem. <i>calĩ</i>	<i>calal-ī</i>	singular used	<i>calila-am</i> (-ām)	<i>calil-ũ</i>
	2	<i>cale-hu</i> , fem. <i>cali-hu</i>	<i>calal-āh</i>	<i>calil-ā</i>	<i>calil-ā</i> or -ē	<i>calil-a</i>
	3	<i>cale-nhi</i> , fem. <i>calĩ</i>	<i>calal-āh</i> , fem. <i>calal-īh</i>	singular used	<i>calil-en</i>	<i>calil-ē</i>

Except Baiswārī and Bihārī, as shown above, none of these change for gender.

SOUTHERN GROUP.

		MARĀṬHĪ.	KŌNKANĪ.
Past Participle		<i>cal'lā</i> , fem. <i>cal'lī</i> , neut. <i>cal'lē</i>	<i>cal'lō</i> , fem. <i>cal'lī</i> , neut. <i>cal'lē</i>
Singular	1	<i>cal'lā-ũ</i> (ō), fem. <i>cal'l-ē</i> , neut. <i>cal'l-ē</i>	<i>cal'l-ō</i> <i>cal'l-ĩ</i> <i>cal'l-ē</i>
	2	<i>cal'lā-s</i> , fem. <i>cal'lī-s</i> , neut. <i>cal'lē-s</i>	<i>cal'lō-i</i> <i>cal'l-ī</i> <i>cal'l-eĩ</i>
	3	<i>cal'lā</i> , fem. <i>cal'lī</i> , neut. <i>cal'lē</i>	<i>cal'lō</i> <i>cal'lī</i> <i>cal'lē</i>

		MARĀTHĪ.	KŌNKANĪ.
Plural	1	masc. fem. neut. <i>cal'l-ō</i>	<i>cal'lē-aũ</i>
	2	masc. fem. neut. <i>cal'l-ā</i>	<i>cal'lē-āt</i>
	3	<i>cal'l-ē,</i> fem. <i>cal'lyā,</i> neut. <i>cal'lyī</i>	<i>cal'lē,</i> fem. <i>cal'leo,</i> neut. <i>cal'lī</i>

Most of the above are examples of the simplest kind of Past tense, that of a neuter verb, in which the only factor affecting the form of the verb is the subject, with which the verb must agree in number and person, and sometimes in gender. In fact the form of this tense is exactly paralleled by Sanskrit and Prākṛit. The Marāṭhī *tō cal'lā*, is exactly paralleled by the Sanskrit *sa calitaḥ*, Prākṛit *sō caliō*. This idiom, in which the subject of the sentence is also the subject of the verb, and agrees with the latter in number, person (and gender), is called the *Kartari prayōga*, or Active construction.

When, however, the verb is transitive, the Past Participle is a passive one, and we have a different set of phænomena. Take the transitive root *mār*, 'kill.' In Sanskrit, the Past Participle is *mārīta*, and *sa mārītaḥ* does not mean 'he killed,' as *sa calitaḥ* means 'he went,' but means 'he was killed.' If we wish to use this Past Participle in an active sense, for 'he killed,' we must say '*tēna marītaḥ*' 'by him killed,' and for 'he killed a man,' we must say 'a man (was) killed by him,' in which the object of the sentence becomes the subject of the verb, and the subject of the sentence becomes the agent, in the instrumental case, after the verb. We have the same in the Indo-Aryan Vernaculars. In Hindī *wah māryau* does not mean 'he killed,' but 'he was killed.' For 'he killed,' we must say *vā nē māryau*, 'by him killed.' So also 'he killed a man' is *vā nē manuṣ māryau*, 'by him a man was killed.' So *vā nē strī mārī*,¹ is 'he killed a woman,' 'by him a woman was killed,' in which the verb agrees in gender, number and person with the object, not with the subject of the sentence. As the Past Participle is used passively, this is called *Karmaṇi prayōga*, or Passive construction.

There is, however, another way of dealing with a Past Participle passive the impersonal method, familiar to those who remember the 'actum est de Balbo,' of our school-boy days. Here the participle is

¹ It is not suggested that these examples are idiomatic Hindī.

put in the neuter gender, and the object of the verb is put in the dative (a kind of *dativus commodi*). Thus for 'he killed the man,' we may say 'by him, with reference to the man (dative), it was killed' (neuter singular),¹ *vā nē manuṣ kaũ māryau*; or for 'he killed the woman,' *vā nē strī kaũ māryau* 'by him, with reference to the woman, it was killed' (or 'the act of killing was done'). This is called the *Bhāvē prayōga*, or Impersonal construction. All these *prayōgas* are met with in the conjugation of the Past tenses of the Indo-Aryan Vernaculars, and hence, although it is a twice-told tale, it has to be again explained, for the sake of what follows. I now proceed to give examples of the Past tense of transitive verbs.

CENTRAL FAMILY.

For Eastern Pañjābī, Gujarātī, Hindī and Central Pahārī, the Past Participle of transitive verbs is used, either in the *Karmaṇi* (passive) or in the *Bhāvē* (impersonal) construction. The forms of the Past Participle are those given for the neuter verb. The following is an example taken from Hindī, which language possesses no neuter gender.

(a) *Karmaṇi prayōga*,—*vā nē strī mārī*, 'he killed a woman,' literally, 'by him (*vā nē*) a woman (*strī*) was killed (*mārī*, fem. of *māryau*, to agree with the feminine noun *strī*),' *ab illo mulier interfecta*.

(b) *Bhāvē prayōga*,—*vā nē strī kaũ māryau*, 'he killed the woman,' literally 'by him (*vā nē*), with reference to the woman (*strī kaũ*), it was killed (*māryau*, used impersonally, in the masculine, as Hindī possesses no neuter).' In unidiomatic Latin this might be represented by *ab illo de muliere interfectum*, for *ab illo mulier interfecta*.

In Naipālī, only the *Bhāvē prayōga* occurs. The verb does not change for gender. The terminations are the same as in the neuter verb. An example is *hāmiharu lē kēṭi lāi māryaũ*, 'we killed the girl.' Here *māryaũ* is a compound of *māryō*, the past participle, 'killed,' and *ũ*, the instrumental pronominal suffix of the first person plural, which we also find in Sindhī. *Māryaũ* means 'killed (*māryō*)-by-me (*ũ*),' and the whole phrase is literally 'by (*lē*) us (*hāmiharu*) with-regard-to (*lāi*) the girl (*kēṭi*) it-was-killed-by-us (*māryaũ*),' the instrumental pronoun being repeated in the suffix, just as I have in a former essay shown to be the case in Kāçmīrī.

NORTH-WESTERN FAMILY.

Here we at once see a marked difference between transitive and intransitive verbs; owing to the change of suffixes. In intransitive verbs,

¹ In Vernaculars which have no neuter, the masculine singular is of course used.

the subject of the sentence is in the nominative case owing to the *Kartari prayōga*, and the suffixes are hence also those of the nominative case. On the other hand, in the case of transitive verbs, either the *Karmaṇi* or the *Bhāvē prayōga* is adopted, and the subject of the sentence is necessarily in the instrumental. Hence the suffixes are also those of the instrumental case.

		SINDHĪ.	WESTERN PAÑJĀBĪ.	KĀÇMĪRĪ.
Past Participle.		<i>Māriō.</i>	<i>Māriā, or *Māriō.</i>	<i>Mōr^u</i> (Sg. Masc.)
Singular	1	<i>māriō, or māriu-me</i>	<i>māriu-m</i>	<i>mōr^u or moru-m</i>
„	2	<i>māriō or māryu-e</i>	<i>mār-ēi</i>	<i>mōru-t</i>
„	3	<i>māriō or māriā-ĩ</i>	<i>māriu-s</i>	<i>mor^u or mōru-n</i>
Plural	1	<i>māriō or māriō-sũ</i>	<i>māriō-sē</i>	<i>mōr^u</i>
„	2	<i>māriō or māry-va</i>	<i>māriō-hē</i>	<i>mōr^u -va</i>
„	3	<i>māriō or māriā-ũ</i>	<i>māriō-hē</i>	<i>mōr^u or mōru-k</i>

In Western Pañjābī, according to Mr. Bomford’s Grammar, the forms of the verb are not changed according to the object of the sentence. The *Bhāvē prayōga* is, therefore, the only one in use in that language. In Sindhī and Kaçmīrī, both the *Karmaṇi* and *Bhāvē prayōga* are used. In the first case, the Past Participle must, of course, agree with the object of the sentence. Thus, Kaçmīrī, *mōr^u* or *mōru-m* ‘I struck him,’ but *mōri* or *mōri-m*, ‘I killed them.’ So in Sindhī.

EASTERN FAMILY.

EASTERN GROUP.

In this group, the Past Participle does not change for gender. In these languages, too, the formal distinction between the nominative and instrumental cases has disappeared, though the sense that the past tense of a transitive verb is really passive still remains. The old Prakrit termination of the instrumental case of the subject has been worn away, leaving that case in the same form as the nominative. In the

older forms of the language, *e.g.* in old Baiswārī (1630 A.D.), the termination *hi* of the instrumental still existed and was used, but, now-a-days, to take Bengali as an example, the *hi* has disappeared, and the instrumental has been merged in the nominative. Thus for 'he killed the woman,' a Bengali says *tini strī-kē mārilen*, which means apparently 'he' (instead of 'by him') 'with-regard-to-the-woman it-was-killed-by-him (*mārīl-en*),' but *tini* is really an instrumental of which the case termination *hi* has been worn away, leaving the instrumental the same in form as the nominative. In old Baiswārī, the instrumental of this pronoun is *tinahi*. In the Eastern languages even in the case of intransitive verbs, the *Bhāvē prayōga* is used. In Sanskrit for 'he went,' we may say either *sā calitaḥ* (*Kartari*) or *tēna calitaṁ*, 'it was gone by him' (*Bhāvē prayōga*). So, in Bengali, *calilen* means 'it was gone (*calil*) by-him (*en*).' That the suffixes are in the Eastern Group really instrumental (*Karmanī* or *Bhāvē*), and not nominative (*Kartari prayōga*), is proved—

- (1) By the analogy of other languages.
- (2) By the fact that the Past Participle is both by origin and meaning a passive.
- (3) By the fact that in Bihārī there are remains of the distinction between nominative and instrumental suffixes still surviving, the former being used only with neuter verbs (*Kartari prayōga*), and the latter only with transitive verbs (*Karmanī* or *Bhāvē prayōga*).
- (4) By the fact that the Perfect tense in Bihārī is clearly in the *Bhāvē prayōga*. It is formed by adding the third person singular of the Present tense of the Verb Substantive, to the Past tense. When a Bihārī wishes to say 'I killed,' he says *māral-ahū*. That this means 'killed-by-me,' and not literally 'I killed,' is proved by the fact that when he wishes to say 'I have killed,' he does not say *māral-ahū chī*, 'I killed am,' but *māral-ahū achī*, 'I killed is,' or literally 'killed-by-me is.' So for 'you have killed,' he says *māral-āh achī*, 'killed-by-you is,' not *māral-āh chāh*. It is much as if we were to say in Bengālī for 'I have killed,' *mārīl-ām āchē*, which form, however, is not employed, a different idiom being used. In the Bihārī Perfect, this *Bhāvē prayōga* is used by Intransitive as well as Transitive verbs. We say *calal-ahū achī*, 'gone-by-me it is,' *mayā gatam asti*, just as we say *māral-ahū achī*, equivalent to the Sanskrit *mayā mārītam asti*. But

in the case of Intransitive verbs we can also use the Past Participle with the Verb Substantive in the *Kartari prayōga*. Instead of *calal-ahũ achī*, we can say *calal chī*, 'gone I am,' *calitō 'smi*, while on the other hand we cannot use such a form in the case of Transitive verbs. We cannot say, for the Perfect active '*māral chī*, which would mean, 'killed I am,' 'I am killed,' not 'I have killed.' Bihārī, however attempts to use the *Kartari prayōga* in the case of Transitive verbs, and does so by a curious periphrasis. Instead of saying *mārala-ahũ achī*, 'beaten-by-me is,' we can also optionally say 'by-means-of-(so and so)-being-beaten I am,' *māralē chhī*. Here the Past Participle Passive is put in the Instrumental case, as if we were to say in Sanskrit, *aham Dēva-dattēna mārītēna asmi*, 'I, by means of the beaten Dēva-datta, am.' It is true that before all these verbs the subject-pronoun appears to be in the Nominative case, but, as already explained that is because no true Instrumental form of any Pronoun has survived in Maithili, or, indeed, in any Eastern Indian Language. Instead of saying '*mayā mārītam asti*,' all the languages of the Eastern Family apparently say *aham mārītam asti*, a purely nonsensical phrase, merely because the special form for *mayā* has disappeared altogether, and the word for *aham* is used instead of it.

An interesting light on this loss of the sense of the original passive meaning of the past tense is shown by the Gujarātī corruption of the *Bhāvē prayōga*. In that construction, the passive participle being used impersonally, should be in the neuter. In Gujarātī, however, this is forgotten, and the passive participle agrees in number and person with the object of the sentence, which is, according to custom, in the dative case. Thus *tēṇē rāṇī nē mārī*, is in the *Bhāvē prayōga*, and means 'he killed the queen.' It should be properly *tēṇē rāṇī nē māryū*, 'by him (*tēṇē*) with-reference-to-the-queen (*rāṇī nē*) it-was-killed (*māryū*),' but *māryū* (neuter) is changed to the feminine *mārī*, to agree with *rāṇī*, as if it were in the *Karmanī prayōga*, which it is not.

With the exception of Bihārī, none of the Eastern languages make any distinction between the conjugation of the past tense of intransitive and transitive verbs. I hence, here, content myself, with giving only the Bihārī conjugation of both forms.

BIHĀRĪ (MAITHILĪ).

	INTRANSITIVE.	TRANSITIVE.
Past Participle.	<i>Calal.</i>	<i>Māral.</i>
Singular 1	<i>calal-ahũ</i>	<i>māral-ahũ.</i>
„ 2	<i>calal-ē</i>	<i>māral-ē.</i>
„ 3	<i>calal</i> , fem. <i>calalⁱ</i>	<i>māral-ak.</i>
Plural 1	<i>calal-ī</i>	<i>māral-ī</i> (or <i>māral</i>).
„ 2	<i>calal-āh</i>	<i>māral-āh.</i>
„ 3	<i>calal-āh</i> , fem. <i>calal-īh</i>	<i>māral-anhⁱ.</i>

The origin of the above terminations has been discussed in my previous essay on Kāçmīrī Pronominal Suffixes and will be referred to again. Suffice it to point out here that the intransitive forms of the third persons singular and plural are adjectival participles used in the *Kartari prayōga*, while the terminations of the other persons of the intransitive verb and of all the persons of the transitive verb are instrumental ones used in the *Bhāvē prayōga*.

There is one very interesting form in Bengali, the optional form of the third person singular in *ēk*, to which I wish to draw attention. It also occurs in the Bengali future (*maribē* or *marib-ēk*) third person singular, which is, as I shall shortly show, also formed from a Passive participle, and is built upon the principle of the *Bhāvē prayōga*, but does not occur in the Past Conditional, which being formed from the Active Present Participle, is built upon the basis of the *Kartari prayōga*. It is now-a-days considered vulgar, but it is a genuine termination all the same. It is the pronominal suffix *k*, of the third person, which we have already met in Kāçmīrī and Maithilī.¹ Thus *calila* means 'he went,' but *māril-ēk* means 'killed (*maril*),' 'by him (*ēk*).' We cannot say *mārit-ēk*, because that would mean 'killing-by-him,' which would be nonsense for the purpose of the idea to be conveyed. It may be added, that the third person singular of the Bengali Imperative also ends in *k*. Thus, *māru-k*, 'let him kill.'

¹ See *ante* pp. 346 and 350.

SOUTHERN GROUP.

Marāṭhī and Kōnkanī, in the case of Transitive Verbs, use either the *Karmaṇi* or *Bhāvē prayōga*, and do not add pronominal suffixes. Hence the Past Participles are merely used in a Passive sense, agreeing in gender and number (when in the *Karmaṇi prayōga*) with the object of the sentence, as already explained. Further examples are therefore unnecessary.

The following are examples of tenses based on the **Present Participle**. This participle is an Active one, and hence the *Kartarī prayōga* is used throughout.

CENTRAL FAMILY.

		EASTERN PAÑJĀBĪ.	GUJĀRĀTĪ.	RĀJPUTĀNĪ.	HINDĪ (BRAJ).	CENTRAL PAHĀRĪ.	NAIPĀLĪ.
Present Participle.		<i>cal'dā</i>	<i>cāl'tō</i>	<i>cal'tō</i>	<i>cal'tu</i>	<i>cal'dō</i>	<i>cal'da</i>
Singular	1	} <i>cal'dā</i>	<i>cāl'tō</i>	<i>cal'tō</i>	<i>cal'tu</i>	<i>cal'dō</i>	Not used.
„	2						
„	3						
Plural	1	} <i>cal'dē'</i>	<i>cāl'tā</i>	<i>cal'tā</i>	<i>cal'tu</i>	<i>cal'dā</i>	
„	2						
„	3						

In Gujārātī this tense is a Habitual Past. Its weak form *calat* is the Past Conditional. In Eastern Pañjābī, Rājputānī, Hindī and Central Pahārī it usually has a conditional sense. Naipālī uses a periphrastic form.

NORTH-WESTERN FAMILY.

		SINDHĪ.	WESTERN PAÑJĀBĪ.	KĀÇMĪRĪ.
Present Participiple.		<i>calandō</i>	<i>calandā</i>	
Singular	1	<i>calandu-se</i> ¹	} (Optional). <i>calandā</i>	Not used.
„	2	<i>caland-ē</i>		
„	3	<i>calandō</i>		
Plural	1	<i>calandā-sē</i>	} <i>calandē</i>	
„	2	<i>calandā-u</i>		
„	3	<i>calandā</i>		

In Sindhī, the tense has the power of a Future. In Western Pañjābī, the form (which is borrowed from the neighbouring Rājputānī) is optional. A periphrastic form is more usual. The meaning is that of a Past Conditional.

EASTERN FAMILY.

EASTERN GROUP.

		BAISWĀRĪ (RĀMĀYAN).	BIHĀRĪ (MAITHILĪ).	ASSAMESE.	BENGALI.	ORİYĀ.
Present Participiple.		<i>calat</i>	<i>calait</i>		<i>*calita</i>	<i>calantō</i>
Singular	1	<i>calate-ū</i> ²	<i>calit-ahū</i> (or <i>calait-ahū</i> and so throughout)	Not used. A periphrastic form is employed.	...	<i>calant-i</i> .
„	2	no example	<i>calit-ē</i>		<i>calit-is</i>	<i>calant-u</i>
„	3	no example	<i>calait</i>		<i>calit-a</i>	<i>calant-ā</i>
Plural	1	no example	<i>calat-ī</i>		<i>calita-am</i> (-ām)	<i>calant-u</i>
„	2	<i>calate-hu</i>	<i>calit-āh</i>		<i>calit-ā</i> or <i>-ē</i>	<i>calant-a</i>
„	3	no example	<i>calit-anh</i> ⁱ		<i>calite-n</i>	<i>calant-ē</i>

¹ Fem., *calandia-se*, &c.² Fem. *calati-ū*.

In Baiswārī, Bihārī and Bengali, this is a Past Conditional.

In Oṛiyā, it is, usually, a Habitual Past.

SOUTHERN GROUP.

	MARĀṬHĪ.	KŌNKANĪ.
Present Participle.	<i>cālūt, cāl'tä</i> * <i>cāl'tō</i>	<i>cāl-tā</i> <i>cāl-tō</i>
Singular 1	<i>cāl't-ō</i> ¹	<i>cāl't-ā</i> <i>cāl't-ō</i> ^{2 3}
„ 2	<i>cāl'tō-s</i> <i>cāl'ta-s</i> ²	<i>cāl't-ai</i> <i>cal'tō-i</i> ²
„ 3	<i>cāl'tō</i> <i>cāl'tā</i> ²	<i>cal'tā</i> <i>cal'tō</i> ²
Plural 1	<i>cāl't-ō</i>	<i>cal't-aũ</i> <i>cal'tē-aũ</i> ²
„ 2	<i>cāl't-ā</i>	<i>cal't-āt</i> <i>cal'tē-āt</i> ²
„ 3	<i>cāl't-āt</i> <i>cāl't-ē</i> ²	<i>cal't-āt</i> <i>cal'tē</i> ²

We now come to tenses formed from the **Future Participle**. This is derived from the Sanskrit Participle in *tavya*, which is a Passive, not an Active Participle. *Calitavya* means 'to be gone,' and, as a participle, can only be used impersonally (*Bhāvē prayōga*) in the neuter, *calitavyaṁ*, 'it is to be gone,' 'one must go,' *eundum est*. *Māritavyaḥ*, means 'he is to be killed.' We should hence expect to find that the passive construction is followed, and this, it will be seen, is the case.

Participial tenses from the Future Participle have survived only in Marāṭhī, Gujarātī, and the Eastern Group. In the first two, the

¹ Fem. *cal't-ē*; Neut. *cal't-ē*, and so throughout.

² This tense is used in both as a Present Indicative, and as a Past Conditional. When two forms are given for the same person, the first is the Present and the second the Past.

³ Fem. *cal't-ī*, Neut., *cal't-ē*, and so throughout.

tense is used as a Present Conjunctive, and, in the last, as a Simple Future. The forms are as follows :—

CENTRAL FAMILY.

GUJARĀTĪ.

In this language, the Future Participle is used alone without suffixes.

In the case of intransitive verbs, it is used passively and impersonally, in the neuter gender, for all persons (*Bhāvē prayōga*) ; e. g., *tēṇē cāl'vũ*, 'he must go,' lit. 'by him (*tēṇē*) it is to be gone (*cāl'vũ*),' Sanskrit *tēna calitavyam*.

In the case of transitive verbs, it is used passively, in the *Karmanī prayōga*, e. g., *tēṇē dikrī mār'vī*, 'he may' or 'should kill the girl,' literally 'by him (*tēṇē*) the girl (*dikrī*) is-to-be-killed (*mār'vī*, fem. to agree with *dikrī*).'

EASTERN FAMILY.

SOUTHERN GROUP.

MARĀṬHĪ.

In the case of intransitive verbs, the *Bhāvē prayōga* is followed, as in Gujarātī, e. g., *tyā ñē cālāvē*, 'he must go,' lit. 'by him (*tyā ñē*) it-is-to-be-gone (*cālāvē*).' A tendency exists, however, to forget the passive force of this participle, and thus we sometimes find the *Kartari prayōga* adopted, the participle agreeing in gender and number with the subject, e. g., *tō cālāvā* (masc.), *tī cālāvī* (fem.), *tē cālāvē* (neut.), 'he, she,' or 'it, may go.' Moreover, in this case, the second person singular takes the suffix *s*, and the second person plural, the suffix *t*.

In transitive verbs either the *Karmanī* or the *Bhāvē prayōga* is used, and never the *Kartari*. Thus, '*tyā ñē mārāvī*,' 'he may kill her,' lit. 'she-may-be killed (*mārāvī*, fem.) by him (*tyā ñē*).' This is the *Karmanī prayōga*. The *Bhāvē prayōga* is *tyā ñē mārāvē*, 'he may kill' lit., 'it-is-to-be-killed (neut.) by him.' No suffixes are used.

EASTERN GROUP.

In this group of languages the Future is conjugated like other participial tenses. As in the case of the Past tense, both in transitive and in intransitive verbs, the *Bhāvē prayōga* is alone employed, though we are not, in this case, able to bring in Bihārī to our assistance in proving it, for in that language the tense is defective. The terminations are nearly the same as those of the Past tense. In the Old Baiswārī of the Rāmāyan, the *Bhāvē prayōga* is very clearly used, the simple form of the Future Participle masculine (i.e., neuter)

being employed for all persons. This clearly shows how the modern terminations are all late pronominal suffixes tacked on to a neuter Future Participle passive used impersonally. Thus the Bengālī *māribē*, 'he will kill' is to be analysed into the neuter Passive Participle *mārib*, 'it-is-to-be-killed,' and *ē* 'by him.'

So also, in the Bengali second person singular, the tense which is formed from the active Present Participle,—the Past Conditional,—takes the termination *is*, e. g., *māritis* (*Kartari prayōga*), but the tenses formed from passive participles take the termination *i*, e. g., *māribi*, *māribi* (*Bhāvē prayōga*). It hence follows that *is* is a direct pronominal suffix of the nominative, and *i* an oblique pronominal suffix of the instrumental. Similarly, in Oṛiyā the termination of the first person plural is twofold. The direct form is *u* and the oblique form is *ũ*. These oblique terminations are also used in the *Bhāvē prayōga* with the past tenses of neuter verbs, but they are never used with tenses formed from the active Present Participle, which unlike the Past Participle (which is impersonally passive in the case of intransitive verbs, and personally passive in the case of transitive verbs) is never used in a passive construction.

	OLD BAISWĀRĪ (<i>Bhāvē prayōga</i>).	BIHĀRĪ (MAITHILĪ.	ASSAMESE.	BENGALI.	OṚIYĀ.
Future Participle.	<i>mārab.</i>	<i>mārab.</i>	<i>māriba.</i>	* <i>mārib</i>	<i>māriba.</i>
Singular 1	<i>mārāb</i>	<i>mārab-ahũ</i>	Plural form used.	<i>mārib-a</i> (pron. <i>māribō</i>)	<i>mārib-i</i>
„ 2	<i>mārab</i>	<i>mārab-ē</i>	<i>mārib-i</i>	<i>mārib-i</i>	<i>mārib-u</i>
„ 3	<i>mārab</i>	not used.	<i>mārib-a</i>	<i>mārib-ē</i> or <i>mārib-ēk</i>	<i>mārib-a</i>
Plural 1	<i>mārab</i>	<i>mārab</i> , (other dia- lects <i>mārab-i</i>)	<i>mārim</i>	Singular form used.	<i>mārib-ũ</i>
„ 2	<i>mārab</i>	<i>mārab-āh</i>	<i>mārib-a</i>	<i>mārib-ā</i> or <i>-ē</i>	<i>mārib-a</i>
„ 3	<i>mārab</i>	not used.	Singular form used	<i>mārib-en</i>	<i>mārib-ē</i>

In Bihārī, the third person is founded on another base, derived from the Present Participle used in the *Kartari prayōga*.

It has been necessary to give all this detail, to show that the terminations of the Participial Tenses have nothing in common with those of the Radical Tenses. To make this quite clear, I now group together the terminations, Radical and Participial, of the four typical languages, Hindī, Kāçmīrī, Bengali and Marāṭhī.

HINDĪ.						
Singular.			Plural.			
1	2	3	1	2	3	
Radical Termns.	<i>aũ</i>	<i>ai</i>	<i>ai</i>	<i>aĩ</i>	<i>au</i>	<i>aĩ</i>
Participial Termns	—	—	—	—	—	—
KĀÇMĪRĪ.						
Singular.			Plural.			
1	2	3	1	2	3	
Radical Termns.	<i>a</i>	wanting (Sindhī <i>ẽ</i>)	<i>i</i>	<i>au</i>	<i>iu</i>	<i>an</i>
Participial Termns.	Kartari <i>s</i>	<i>k</i>	—	—	<i>vā</i>	—
	Karmaṇi <i>m</i>	<i>t</i>	—	(Sindhī <i>sĩ</i>)	<i>vā</i>	—
		(or <i>n</i>)	(Sindhī <i>sũ</i>)			(or <i>k</i>)
BENGALI.						
Singular.			Plural.			
1	2	3	1	2	3	
Radical Termns.	wanting	<i>is</i>	<i>ē</i>	<i>i</i>	<i>a</i>	<i>en</i>
Participial Termns.	<i>u</i> (fut. <i>a</i>)	<i>is</i> (Dir.)—(fut. <i>ē</i>)	<i>ā</i>	<i>ā</i> or <i>ē</i>	<i>en</i>	
		<i>i</i> (Obl.)				
MARĀṬHĪ.						
Singular.			Plural.			
1	2	3	1	2	3	
Radical Termns.	<i>ẽ</i>	<i>ēs</i>	<i>ē</i>	<i>ũ</i>	<i>ã</i>	<i>at</i>
Participial Termns.	Kartari <i>õ</i>	<i>s</i>	—	<i>ã</i>	<i>ã</i>	—
	Karmaṇi —	—	—	—	—	—

A glance at the above will show the difference between the terminations of the Radical and the terminations of the Participial tenses, and the extreme improbability of their having a common origin.

We can now construct the following Table of pronominal suffixes in the Indo-Aryan Vernaculars.

	KĀÇMĪRĪ.	WESTERN PAÑJĀBĪ.	SINDHĪ.	NAIPĀLĪ.	O. BAISWĀRĪ	BIHĀRĪ (MAITHILĪ).	ASSAMESE.	BENGALĪ.	ORİYĀ.	MARĀṬHĪ.
1st Person										
Sing. Dir.	<i>m, s</i>	<i>m, s</i>	<i>{ me, se }</i>	<i>{ ē }</i>	nasal	<i>ahũ</i>	<i>ō</i>	<i>u, a</i>	<i>i</i>	<i>ũ</i>
Sing. Obl.	<i>m</i>	<i>m</i>	<i>{ me }</i>	<i>{ ē }</i>						
Plur. Dir.	—	<i>{ sē }</i>	<i>{ sī, sũ }</i>	<i>{ aũ }</i>	<i>nhī</i>	<i>{ ī }</i>	want- ing	<i>am</i>	<i>{ u }</i>	<i>ũ</i>
Plur. Obl.	—	<i>{ sē }</i>	<i>{ ũ, sũ }</i>	<i>{ aũ }</i>	<i>nhī</i>	<i>{ — or ī }</i>			<i>{ ũ }</i>	—
2nd Person										
Sing. Dir.	<i>h (k)</i>	<i>vē, ō</i>	<i>ē, e</i>	<i>{ is }</i>	—	<i>ē</i>	<i>{ ī }</i>	<i>{ is }</i>	<i>{ u }</i>	<i>s</i>
Sing. Obl.	<i>t (dat. y)</i>	<i>ēī (dat. ī)</i>	<i>(ēī), e</i>	<i>{ is }</i>	—		<i>{ ī }</i>	<i>{ i }</i>	—	<i>s</i>
Plur. Dir.	<i>{ va }</i>	<i>vē</i>	<i>u, va</i>	<i>{ au }</i>	<i>hu</i>	<i>āh</i>	<i>ā</i>	<i>ā, ē</i>	<i>{ a }</i>	<i>ā</i>
Plur. Obl.	<i>{ va }</i>	<i>vē, ō</i>	<i>va</i>	<i>{ au }</i>	<i>hu</i>	<i>āh</i>	<i>ā</i>	<i>ā, ē</i>	<i>{ a }</i>	<i>—, t</i>
3rd Person										
Sing. Dir.	<i>n</i>	<i>{ s }</i>	—	—	—	—	<i>{ ē, a }</i>	—	—	—
Sing. Obl.	<i>n (dat. s)</i>	<i>{ s }</i>	<i>se (instr. ī)</i>	—	—	<i>ak</i>	<i>{ ē, a }</i>	<i>{ ē, ēk }</i>	—	—
Plur. Dir.	<i>{ h (k) }</i>	—	—	—	<i>{ nhī }</i>	<i>{ (āh), anhi }</i>	want- ing	<i>en</i>	<i>ē (?)</i>	—
Plur. Obl.	<i>{ h (k) }</i>	<i>hē, ni</i>	<i>ne (instr. ũ)</i>	—	<i>{ nhī }</i>	<i>{ anhi }</i>				

The origin of most of these forms has been discussed when dealing with Kāçmīrī suffixes in my former article¹. I have there more especially given my views as to the derivation of the suffixes used in the North-Western languages, and in Bihārī. Most of the remaining suffixes can be explained by a reference to those remarks. Taking them, person by person, we find the following results:—

First Person. The termination *ahũ* (Bihārī), *aũ* (Baiswārī), nasal (Baiswārī), *ō* (Assamese), *u* and its weakened form *a* (pronounced *ō* in Bengālī), *u* and *ũ* (Oriyā and Marāṭhī), can all be explained by the derivation given for the Sindhī *ũ*, the Ap. Prakrit Genitive Plural *amhahā*; or perhaps direct forms, such as the Oriyā *u*, may come from

¹ Ante, pp. 345 and ff.

the Ap. Pr. Nom. Sing. *haũ*, 'I'. The terminations *ẽ* (Naipālī), *ī* (Bihārī) are naturally referred to the Prakrit form *amhẽ* (both Nominative and Genitive Plural, H. C., iii, 106, 114, iv, 376), through **mhẽ*, **hẽ*. It will be observed that in Maithilī *ī* is both a direct and an oblique form : but that, as an oblique form, it can be dropped, leaving the verb in the *Bhāvẽ prayōga*. In Kaçmīrī, the suffix of the first person plural is also dropped. The Bengali *am*, is, of course, the same as the Kaçmīrī *m*, and is properly an oblique form.

Second Person. The termination *s* (Naipālī, Bengali and Marāṭhī) presents some difficulty. It may possibly be the Sanskrit-Prakrit termination *si* of the second person, which has survived in the Radical tenses of Bengālī and Marāṭhī, but not in Naipālī, used by false analogy. This explanation, besides being, at best, a *pis aller*, scarcely applies to Naipālī. I prefer, therefore, to consider it as a termination borrowed either from the first or from the third person. In Bihārī nearly every form of the first person, can also be used for the second person, so that there is no inherent impossibility of the *s* suffix of the first person being used for the second. Or we may refer to the well known honorific use of the third person instead of the second. The termination *ẽ* (Bihārī), *i* (Assamese, Bengali), *ẽ* (Bengali), are originally oblique forms, the same as the Kāçmīrī *y*, the Western Pañjābī *ẽi*, and the Sindhī *ẽ*. It will be noted that the *s* suffixes of the first person are direct forms, and this distinction is borne out by Bengali, which has *is* for its direct, and *i* for its oblique suffixes of the second person singular. The terminations *hu*, *āh* (for *ahu*), *au*, *ā*, and *ã*, must be referred to the suffix *h*, *hẽ*, which we have met in Kāçmīrī and Western Pañjābī. Their origin is one of the many forms of the Prakrit pronoun of the second person, of which *uyhẽ* (H. C. iii, 91), is the most probable. The Marāṭhī *t* we have already met in Kāçmīrī. The oblique singular is used instead of the oblique plural. It cannot be connected with the Sanskrit-Prakrit *tha* (dual *thas*), which would become not *t*, but *h* or *hu*. Possibly, however, the *direct* Marāṭhī forms are borrowed by false analogy from the Radical Tenses.

Third Person. The terminations *nhi*, *anhⁱ*, and *en*, have been already explained in my former paper.¹ They are derived from the Prakrit *ṇẽhĩ*. So also, as there explained, *āh*, as shown by its feminine form *ih*, is most probably not a pronominal suffix at all, but merely an old plural termination of the Present or Past Participle, to which it is added. The termination *ẽ*, or *a*, and also the termination *ẽk*, is a weakened form of *ai*, as previously explained. With regard to the *k* in *ẽk*, see *Ante*, pp. 350, 366. The North-Western forms have already been fully discussed.²

¹ *Ante*, p. 347.² p. 347.

P. S., On p. 356, I have omitted to draw attention to the fact that, in Kāçmirī, the old Present being used as a Future Indicative, the old *h*-Future has not been abandoned, but reappears as a Past Subjunctive, ‘(If) I went.’ Its forms are as follows:—

Sing.	1	<i>tsalaha</i>
„	2	<i>tsalaha-k</i>
„	3	<i>tsalihē</i>
Plur.	1	<i>tsalahau</i>
„	2	<i>tsalahiu</i>
„	3	<i>tsalahaz</i>



Notes on the ancient topography of the Pīr Pānṭsāl Route.—By

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[Read February 1896.]

The following notes on an ancient mountain-route of Kaçmīr have been collected by me while engaged in the preparation of an annotated translation of Kalhaṇa's *Rājataranginī* which is to follow my edition of the Sanskrit text of that Chronicle. Their publication in the present form may, perhaps, be acceptable as an illustration of the aid which a search for the surviving local traditions of Kaçmīr and a study of its topography afford for the elucidation of Kalhaṇa's narrative.¹

The Pass of the *Pīr Pānṭsāl*,² 11,400 feet above the sea, forms the lowest point in the central part of the mountain-range which, reaching with its snowy peaks a height of more than 15,000 feet, encloses the Valley of Kaçmīr on the south and south-west. The pass gives access to the valleys of the two *Tōhīs* (Skr. *Tauṣī*) of *Rajaurī* (*Rājapurī*) and *Prūntz* (*Parṇōtsa*) from which easy and direct routes of communication lead to the central and western Panjāb.

These natural advantages evidently influenced Akbar when he chose after the conquest of the Valley the route *viā* Bhimbhar and Rajaurī and over the *Pīr Pānṭsāl* for the construction of his 'Imperial Road' (*rāh-i shāhī*) which was to connect Lahore with his summer residence Kaçmīr. Along this road passed in the reigns of Akbar's

¹ An abbreviated translation of these notes, has been contributed to the '*Festgabe*, offered to Professor Albrecht Weber, on occasion of his Fifty Years' Doctor Jubilee (18th December, 1895).

² I write the name according to its usual Kaçmīrī pronunciation. The latter we find already, with the transcription required by the Sanskrit alphabet, attested in the form *Pāñcāla dēva* of Çrīvara's Chronicle, iii. 433. The Pahārī population of the valleys to the south calls the pass *Pīr Pāncāl*. This is also the form recorded by the accurate Moorcroft. *Anglo-Indicè* the form *Pīr Panjāl* has been generally accepted. The name *Pānṭsāl* is used for the whole mountain range. The word *Pīr*, probably of Muhammadan origin, serves in Kaçmīr as the designation of every pass; comp. Drew, *Jummoo and Kashmir Territories*, London, 1875, p. 157.

immediate successors the almost annual migrations of the Mughal Court to Kaçmīr.

We owe to this circumstance the first European description of the pass, written by one of the best observers who ever travelled in India. Dr. Bernier, then in the service of Dāniṣṡmand Khān, one of Aurangzēb's Omras, followed this route to Kaçmīr in the spring of 1665, in the train of the Imperial Court. The account he has left us in the Ninth Letter to Monsieur de Merveilles of his observations and experiences, is as attractive as it is accurate.¹

The old Imperial Road, though reduced in the course of time to the condition of a mere bridle-path,—bad at that in many places—has remained a favorite route for trade and traffic until the recent construction of the Jhelam Valley Road. It has accordingly been often described in the works of modern travellers, such as Moorcroft, Von Hügel, Vigne, Drew and others²,—not to mention the various guide-books. Referring to these works for more detailed information, I may hope that the following brief indications regarding the topography of the route will be found sufficient for the comprehension of the historical notices to be discussed below from Kalhaṇa's Rājataranginī and the later Sanskrit Chronicles of Kaçmīr.

The ascent to the Pīr Pant̥sāl Pass begins for the traveller from the south at the village of *Bahramgalla*, the *Bhairavagala* of Çrīvara's Chronicle, and follows in an easterly direction the bed of a mountain stream as far as the hamlet of *Puṣiāna*, which is inhabited only in the summer months and is mentioned under the name of *Puṣyāṇanāda* in several passages of the Chronicles. From the latter place the road rises in steep zigzags to the pass which lies about 3,000 feet higher; it then descends on the Kaçmīr side in a gently sloping valley to the Mughal Sarāi of 'Alīābād which lies about $4\frac{1}{2}$ miles further to the east. At this point steep transverse ridges, descending from the mountain ranges on the north and south, approach close to the bed of the stream which flows from the pass, and narrow the valley into a gorge. The 'Imperial Road,' cut into the precipitous cliffs of the left or northern side and carried in parts on a masonry foundation, leads down the valley, keeping high above the stream.

Opposite to the point where the Pīr Pant̥sāl stream is joined by the *Rūprī* river from the south, the road passes the old watch-towers of *Inganārī*. A short distance further down it crosses to the right

¹ Compare *Travels in the Mogul Empire*, by François Bernier, pp. 406 sqq., in A. Constable's careful and well-got up translation, London, 1891.

² Perhaps best in *Travels in Kashmir, Ladak, Iskardo, etc.*, by G. T. Vigne, London, 1842, vol. ii., pp. 261 sqq.

bank of the united stream which from here bears the name of *Rembyāra* (Skr. *Ramanyātavī*). The valley which is clothed with luxuriant fir forest, gradually widens, and after a march of about 11 miles from 'Alīābād Sarāi we reach *Hör^apōr*, the *Çūrapura* of the Chronicles, which is the first permanently inhabited place in the valley and the end station of the route through the mountains. Some four miles below *Hör^apōr* the *Rembyāra* enters the open valley of *Kaçmīr*.

Kalhaṇa's first reference to this mountain-route is connected with a local legend which he relates to us in the account of King *Mihirakula's* reign. Notwithstanding the wholly erroneous date which the artificial chronology adopted in the first three cantos of the *Rājatarangīnī* assigns to this prince, modern research could not fail to recognize in the latter the White Hūn ruler of that name whose reign, according to the epigraphical evidence first collected by Mr. Fleet,¹ must be placed at about 515-550 A.D., and of whom we know from Hiuen Tsiang's account that his rule extended also over *Kaçmīr*.

In full agreement with the accounts given of *Mihirakula's* character by the Chinese pilgrim Sung-yun who personally met the king in Gandhāra, and a century later by Hiuen Tsiang, the *Kaçmīrian* Chronicle represents him as a ruler of extreme cruelty. Among other legendary anecdotes which are intended to illustrate this feature in *Mihirakula's* character, it is related of him (*Rājatarangīnī*, i. 302-303) that, when he reached on his return from a tour of conquest through the whole of India the 'Gate of *Kaçmīr*' (*Kāçmīraṁ dvāram*) and heard there the death cry of an elephant which had fallen down a precipice, he was so delighted by these gruesome sounds that he had a hundred other elephants forcibly rolled down at the same spot.

The locality here meant is in the text only generally indicated by the term *dvāra*, which is uniformly applied in the Chronicle to all mountain-passes leading into *Kaçmīr*. In order to identify it, we have to turn to the notice of the old glossator A₂ in *Rājānaka Ratnakaṇṭha's* Codex (see note on i. 302 in my Edition) which says: 'From that time onwards the route by which *Mihirakula* returned, bears the name of *Hastivañja*.'

That this notice is old appears from *Abū-l-faẓl's* *Rājatarangīnī* excerpts in the *Āīn-i Akbarī* (transl. by Col. Jarrett, Bibl. Ind., ii., p. 383), in which the place of the event related by Kalhaṇa is referred to under the name of '*Hastivatar*'. That the latter form is only a clerical error for *Hastivanj*, easily explained in Persian writing, can clearly be seen from a comparison of the Persian Chronicles of *Nārāyan Kōl* and *Bīr^abal Kātser^u*

¹ Compare his paper 'On the history and date of *Mihirakula*,' *Indian Antiquary* xv., pp. 245 sqq.

(MSS. in my possession). These two compilers who, though of a far more modern date, can be shown to have derived their information from the same sources, reproduce Kalhaṇa's anecdote with a remark to the effect that the locality was in their days still known by the name of *Hastivanj* and was situated on the Pīr Pant̥sāl route.

The repeated enquiries which I made with reference to these notices among my Paṇḍit friends at Çrīnagar, did not yield any result; neither they themselves or any of their acquaintances had ever heard the name 'Hastivanj.' I accordingly resolved in October 1891 to visit the Pass myself. Already at Hōrāpōr I found that the name was known to the Kaçmīrī cultivators settled there. When subsequently I reached 'Alī-ābād Sarāi I had no difficulty in ascertaining, by a successive cross-examination of such travellers as hailed from the valleys on both sides of the Pass, that the high mountain-ridge which stretches from the south towards the valley of Pīr Pant̥sāl stream and ends just opposite to the Sarāi in a precipitous wall of rocks rising about 2,000 feet above the river bed, bears to this day the name of *Hastivañj*.

All the hillmen who passed by, had heard the story that once upon a time the elephants of some king had fallen over this precipice down into the gorge of the Pīr Pant̥sāl stream. Whether this had happened by accident or otherwise, they could not tell me; nor could they name the king: 'it was so long ago since it had happened.'

But when I asked the older men, and among them my own guide, Pīr Bakhsh from Bahramgalla, what reason there could have been for bringing elephants to that height, they did not hesitate with their answer: it was the old route, they said, which passed over the ridge of *Hastivañj* and along the south side of the valley, before the Emperor Akbar had made his road.

That this tradition is old, can be shown by reference to another passage of Abū-l-faẓl (*l.c.*, Vol. ii. p. 347) which specifies in the direction from Bhimbhar to Kaçmīr, besides the route of the Pīr Pant̥sāl, two other 'good routes'. Of these he names in the first place that of *Hastivatar* (read *Hastivanj*), 'which was the former route for the march of troops'.¹

A glance at the configuration of the mountains or at the maps published by the Survey of India,² is sufficient to explain fully the

¹ By Abū-l-faẓl's third route, *Tangtalah*, is meant a mountain track of that name which crosses the range about 5 miles to the north of the Pīr Pant̥sāl Pass and is to this day often resorted to by smugglers.—The explanations of a Kaçmīrian informant which are quoted in the translator's note on this passage, are based on insufficient local knowledge and hence misleading.

² Comp. 'Map of Jammoo, Kashmir and Adjacent Districts,' 1861, 4 miles to 1 inch; *Map of Kashmir* (surveyed 1855-57), 1877, 2 miles to 1 inch; also Sheets 28, 29 of the 'Atlas of India.'

direction followed by this earlier route. Opposite to 'Alīābād Sarāi there opens towards the south-west a high alpine valley through which a path, perfectly practicable for loaded animals, leads to the mountain lake of *Nandan Sar* and thence over the *Durhāl* Pass to the sources of the Tōhī of Rajaurī. This route which was used with advantage in the years 1814 and 1819 by strong columns of the Sikh army, when advancing on Hōrāpōr, finds its natural continuation on the south or right side of the Pīr Panṭsāl valley, *i.e.*, *viā Hastivañj*. Only by keeping to this side is it possible to avoid wholly the crossing of the Pīr Panṭsāl stream. The latter, as personal experience showed me in the further course of my tour, is not easy to ford even late in the year and would undoubtedly in the time of the melting snows form a still more serious obstacle.

The mountain-ridge of *Hastivañj* which in the north, where it falls off towards the stream, forms a precipitous wall of rock, descends to the west and east with grassy slopes of a comparatively easy gradient. I could not retain any doubt as to the practicability of this route when honest Pīr Bakhsh confessed to me that he, in company with friends from Bahramgalla, had often taken over *Hastivañj* ponies heavily laden with rice. On all these occasions he had successfully evaded the police post of 'Alīābād Sarāi and—the Kaçmīr export-prohibition. Additional evidence for the old route here indicated is furnished by the position of the ancient frontier fort of *Kramavaria* which will be discussed below.

The name *Hastivañj* contains in its first part undoubtedly the Kaçmīrī stem *hastī* 'elephant,' derived from Skr. *hastin*; for the second part *-vañj* I am unable at present to find any clear etymology.¹ In the absence of all indications as to the earlier history or original meaning of the

¹ Abū-l-faẓl explains according to Col. Jarrett's translation *vatar* (recte *vanj*) by 'injury;' but the word is not found with this meaning in modern Kaçmīrī. The above quoted Persian compilers render *vañj* by *raftan*. The inhabitants of the neighbouring valleys know themselves, as far as I could ascertain, of no explanation of the name. The derivation from Skr. *bhagga*, suggested in the note of the translation, is based on an erroneously supposed form of the name (*hastibhañj*) and is untenable.

[While these pages were passing through the press, the learned Editor of this Journal has favored me with an interesting note pointing out that a root $\sqrt{vañj}$ meaning 'to go' occurs in Western Panjābī. As Kaçmīrī, Western Panjābī and Sindhī belong to one group of Indo-Aryan-Vernaculars, the North-Western, this root might have been used in Kaçmīrī too at an earlier stage of the language. The $\sqrt{vañj}$ is not found in modern Kaçmīrī, and if the information given to me by my friends from Bahramgalla is correct, it is unknown also to the Pahārī dialects spoken in the valleys immediately to the south of the Pīr Panṭsāl.—For Western Panjābī forms of this root see Bhai Maya Singh's *Panjābī Dictionary*, Lahore 1895, p. 1194, and O'Brien's *Glossary of the Multānī Language*, Lahore, 1881, p. 276.]

name, we cannot speak with any certainty of the relation it bears to the legend above recorded. Still, it will be well to remember the numerous legends of the West which modern research has traced back in their origin to 'popular etymologies' of old local names, and accordingly to keep in view the possibility that in the case of *Hastivañj*, too, the name may have given rise to the story or at least to its localization at that particular spot. Whatever our views on this point may be, it will be clear from the evidence collected above that Kalhaṇa has preserved for us here, as in many other instances, an old local tradition.¹

The other references of the Chronicle to this route through the mountains may be discussed conveniently in connection with the passages iii. 227 and v. 39. In the first named passage Kalhaṇa relates to us how the poet *Mātr̥gupta*, whom the great *Vikramāditya-Harṣa* of Ujjayinī had nominated regent of Kaṣmīr, found, after crossing the mountains, the Kaṣmīrian ministers waiting for him on the border of the Kingdom. As the place of meeting Kalhaṇa indicates the '*ḍhakka*' called *Kāmbuva*, 'which was then situated in the locality called *Kramavarta*, but is now (*i.e.*, in Kalhaṇa's own time) at *Çūrapura*.'

From the second passage we learn that it was Çūra, the powerful minister of king Avantivarman (*circa* 855-883 A. D.), who transferred the '*ḍhakka*' from *Kramavarta* to the town of *Çūrapura* which he had founded himself.

The general direction in which we have to look for the localities here referred to, is sufficiently indicated by the mention of *Çūrapura*, which is undoubtedly identical with the present *Hör pör*, the end station of the Pīr Pānṭsāl route, as shown above. This is proved, apart from the identity of the names (which is clearly established by the phonetic laws of Kaṣmīrī),² by the numerous passages of the *Rājatarangīṇī* and the later Chronicles which mention *Çūrapura* either as

¹ Bernier witnessed on the Pīr Pānṭsāl an accident which forms a curious counterpart to the legend above discussed. It occurred on the ascent from Puṣiāna and must, therefore, be located on the *opposite* (Panjāb) side of the Pass. The long line of elephants which carried the ladies of Aurangzēb's seraglio, got into confusion on the steep road, with the result that fifteen elephants fell down the precipice and were lost. The curious map of Kaṣmīr which is reproduced in Constable's translation, p. 408, from the Amsterdam Edition of 1672, shows graphically the '*Fire Penjole*' mountain with the troop of elephants rolling down its slopes.

² In *Çūrapura* > *Hörapör* we have the regular phonetic change of Skr. *ç* > Kaṣm. *h*, as illustrated, *e.g.*, by Skr. *çata*, Kaṣm. *hath* 'hundred'; *Çamālā*, *Hamal* (name of Pargana); *çarad*, *harud* 'autumn'. For the shortening of the *u* of the first syllable compare Skr. *tūla*, Kaṣm. *tül* 'mulberry'; *sindūra*, *sindör* 'red lead'; *sūc[ī]*, *süts[an]* 'needle'. -*pura* at the end of local names appears in Kaṣmīrī always as -*pör*; compare *Kalyānapura*, *Kalampör*; *Suyyapura*, *Söpör*; *Parihāsapura*, *Paraspör*, etc.

the entrance station for those arriving in Kaçmīr from *Rājapurī* (Rajaurī), *Bhairavagala* (Bahramgalla), *Puṣyāṇanāḍa* (Puṣiāna), or *vice versā* as the starting place for travellers leaving Kaçmīr in that direction.¹

For the identification of *Kramavarta*, however, and for the elucidation of the otherwise unknown term '*ḍhakka*' we have to turn again to the glossator A₂ who in his note on v. 39 has explained *Kramavarta* by *Kāmelanakōṭṭa* and *ḍhakka* by *drayga*.

The word *drayga* (or *draygā*) is used everywhere by Kalhaṇa and the later Chroniclers (as I hope to prove fully in the second volume of my *Rājataranginī* Edition) for the designation of those frontier forts or watch-stations which closed in old times all passes leading into the Valley. Serving at once the purposes of defence, customs and police administration, these fortified posts have survived on most of the routes until quite recent days.²

¹ Compare *Rājat.* vii. 1348. 1352; viii. 1051. 1266. 1577 sqq.; *Çrīvara*, i. 109 iii. 433; iv. 531. 589. 611, etc.

² Apart from the frontier watch-station discussed above we find mention in *Rājat.* vii. 1596. 1997. 2010 of another *drayga*, bearing the name of *Kārkoṭa*, which closed the *Tōshamaidān* route leading to *Lōhara*, the modern *Loharin*. On a tour undertaken in the autumn of 1892, which led me to the identification of *Lōhara*, I was able to trace also the position of this watch-station, as indicated by the old towers still found above the village of *Drang* (eireiter 74° 36' E. Long., 33° 57' N. Lat.).

Another frontier-post which is mentioned under the designation of *draygā* in *Rājat.* viii. 2507. 2702, has left its name to a high valley of the *Lōlāb Pargana* still known as *Drang*, through which a difficult mountain-path leads to the ancient shrine of the goddess *Çaradā* in the *Kiṣangaygā* Valley. See the abstract of my paper '*Tours archæological and topographical in and about Kaçmīr*,' *ACADEMY*, November 25, 1893.

The famous gate in the gorge of the *Vitastā* below *Varāhamūla* (*Bārāmūla*) which already Hiuen Tsiang knew as the western entrance of the kingdom (see *Life of Hiuen Tsiang*, transl. Beal, p. 68), must also have once borne the name of *drayga*, though Kalhaṇa, viii. 413. 451,—as already Albērūnī before him (see Professor Sachau's translation, I., p. 207)—mentions it only under the general designation of *dvāra* 'gate.' This is proved by the fact that the ruined old gateway, situated on the right river bank just below the town, is known by the people to the present day under the name of *Drang*. Moorcroft does not mention this name which I myself have heard used on repeated visits; but he describes the place with his usual accuracy: 'Below the town the whole space between the river and the mountain is closed by a wooden rampart and folding gates. In the time of the Afghans a strong guard was posted at this place, and the gateway was kept in good repair' (*Travels*, II., p. 280).

'Roads and *draygās*' in general are referred to in the passage *Rājat.* viii. 1991 and custom revenue from *draygās* in verse 258 of the Fourth Chronicle.

The terms *draygika*, *draygin*, *draygika* which frequently recur as technical designations of certain officials in the copper-plate grants of the Valabhī dynasty (comp. *Corpus Inscriptionum Indicarum*, III., p. 169), are in all probability to be

We are all the more justified in accepting the glossator's statement as to the identical meaning of the term *ḍhakka*, as the same frontier-post after its transfer to Çūrapura is directly mentioned by Kalhaṇa under the name of *Çūrapuradrayga*. We find this designation in vii. 1352 and in the interesting passage viii. 1577–1580, which relates, how the commander of this frontier-station (*draygādhīpa*, *draygēṣa*) caught and executed in July-August 1128 A.D., the rebel Utpala, King Sussala's murderer, who was passing through the mountains on a roving expedition from *Puṣyāṇanāḍa* (Puṣiāna).¹

Even later yet, about the end of the fifteenth century, Çrīvara knows the *drayga* of Çūrapura, iv. 582, and refers evidently to the same place when relating, i. 408, of Sultan Zainu-l-'ābidīn that the latter established on the route of Çūrapura a hospice for travellers and settled at the customs station (*ḡulkasthāna*) of the same route load-carriers from *Abhisāra* (i.e., the country about Bhimbhar).

explained according to the above interpretation of *drayga*. The form *drayga* is found in my MS. of the Kaṣmīrian commentary on Maṅkha's Kōṣa as the equivalent of *rakṣāsthāna* 'watch-station,' s. v. *gulma*.

[Since this paper was sent to the press, Messrs. Lévi and Chavannes' important publication, *L'Itinéraire d'Ou-K'ong* (Journal Asiatique, Septembre-Octobre 1895) has reached me. The Chinese traveller, whose life and wanderings it records, passed four years (759–763 A.D.) in Kaṣmīr in study and pilgrimages. We owe to him besides interesting notices of the sacred buildings he visited there, the following curious account of the "Gates" of the Valley (*l.c.*, p. 356).

'Le royaume (de Cachemire) est entouré des quatre côtés par des montagnes qui lui font un rempart extérieur; on y a ouvert en tout trois chemins sur lesquels on a établi des fermetures.' In the routes which lead in the east towards *T'ou-fan* (Tibet) and in the north towards *Po-liu* (Baltistān), we can easily recognize the passes of the *Zōji-lū* and the *Trāgabāl* (of Gilgit Transport notoriety), respectively. The third route, 'le chemin qui part de la porte de l'ouest,' leading towards *Gandhāra*, can be no other but the road which passes through the Varāhamūla gorge. The Pīr Pānṭsāl route may possibly be intended in the following description of a fourth route closed in *Ou-K'ong*'s days: 'Il y a encore un autre chemin; mais il est toujours fermé et ne s'ouvre pas pour un instant que lorsque une armée impériale fait l'honneur de venir.]

¹ The commanders of these frontier-posts play under the title of *mārgēṣa*, *mārgapati*, a great part in the narratives of the later chroniclers. Their duties were entrusted in Mughal times to hereditary '*Maliks*,' true "Lords of the Marches" who retained considerable power and revenues until the time of the Sikh conquest. Their descendants, though deprived long ago of their privileges and most of their Jāgīrs, are found residing to this day at the entrance of the valleys leading to the more important passes, e. g., at *Çupiyon* on the way to Hōrapōr. For interesting information regarding the *Maliks* and the routes in their charge, see the detailed account given by Baron Von Hügel, *Kaschmir und das Reich der Siek*, Stuttgart, 1840 ii., pp. 167 sqq.; i., p. 347.

The above mentioned tour enabled me to identify the position of *Kramavarta* as well as the later site of the guard-station after its transfer to Çūrapara. The name *Kāmēlanakōṭṭa* by which the gloss of *A₂* renders *Kramavarta*, has survived to the present day in the form of *Kāmelankōṭ*, as the designation of a rocky hillock which occupies, on the right side of the valley and just opposite to the towers of Inganārī, the angle formed by the uniting streams from the Pīr Panṭsāl and Rūprī Passes. This hillock which rises with steep and in parts precipitous slopes to a height of about 200 feet above the bottom of the valley, is the last isolated off-shoot of a high mountain-range descending from the south-west. Another branch of the same range, running in a more northerly direction, we have met with already in the ridge of *Hastivañj*.

The top of the hillock forms a small plateau about 200 feet long and 50 feet broad. At its ends stand two octagonal watch-towers, built of massive though coarse masonry and connected by a double stone parapet. This little fort, along with other towers of a similar construction found along the route, does not probably, in its present form, date back beyond the years immediately preceding the Sikh conquest of Kaçmīr, when the Paṭhāns endeavoured on successive occasions to hold the pass against the troops of Fatteh Khān and Ranjit Singh advancing from Rajaurī¹. Still it is evident that the military importance of the position must have been recognized at a far earlier period.

Kāmelankōṭ commands completely the paths which lead between its foot and the near river beds toward *Hastivañj-Pīr Panṭsāl* to the west and the *Rūprī* Pass to the south. The existence of an earlier fortification in this locality is attested by the fact that we find the name already in the gloss of *A₂* with the appended designation *kōṭṭa* 'fort,' Kaçmīrī *kōṭ*. The form *Kāmelan* shows the stem *Kāmel* with the addition of the Kaçmīrī suffix of the plural genitive (objective), - *an* < skr. - *ānām*.

As *Kāmel* itself may be traced back on the evidence of cases of

¹ Baron Von Hügel who passed the little fort in the autumn 1835, describes correctly its shape and situation (*l. c.*, i., p. 198), but calls it 'the castle of *Inganālī Killah*,' evidently confusing its name with that of the towers opposite on the northern bank of the Pīr Panṭsāl stream. Moorcroft who followed this route in 1823, mentions in the same locality two towers named *Kamil Koth* and states that they were erected with other defences by 'Ata Muḥammad Khān, Afghān governor of Kaçmīr, against the invading force of the Afghān Wazīr Fatteh Khān (*Travels*, ii, p. 295). The encounter in which 'Ata Muḥammad Khān was defeated, was fought close to *Kāmelankōṭ*. As this event took place only 11 years before Moorcroft's visit, the information given to the latter as regards the towers, may be assumed to have been correct.

analogous phonetic change to Skr. *Kramavarta*, *Kāmelankōṭ* corresponds to a Skr. * *Kramavartānām kōṭṭa*.¹

The evidence here indicated enables us to recognize with certainty in *Kāmelankōṭ* the *Kramavarta* of Kalhaṇa and thus the earlier position of the frontier-station guarding the Pīr Panṭsāl route. As regards the name *Kāmbuva* which this station bore according to iii. 227, I am unable to give any information. As the name is not found again in the *Rājataranginī* or the later Chronicles the assumption seems justified that it was forgotten at an early period on account of the transfer of the watch-station to Çūrapura and the consequent employment of the new designation *Çūrapuradrayga*.

The later position of the frontier-post is indicated by a local tradition still surviving at *Höṛapōr*, which relates that at a spot situated about $1\frac{1}{4}$ miles above the village, where rocky spurs projecting from the hill sides reduce the level ground of the valley to a narrow defile, there stood once an ancient gate. This place which is covered by dense fir-forest, bears now the name of *Ilāhī Darwāza*, 'the Gate of God'; but the father of the present Muqaddam (or Lambardār), a *safēdrēsh* of very advanced age, remembered to have heard in his youth the name *Drang* also.

Old coins are often found at this spot, and in the under-growth the remains of ruined walls can still be traced. A monument of ancient art is seen about 330 yards higher up the valley, where a large rock, lying close to the river bank, shows in three richly decorated niches, over 4 feet high, well-carved relievo representations of temples of the Kaçmīrian style.

Höṛapōr which until the recent construction of the Jhelam Valley Road saw a considerable amount of trade and is still the seat of a customs-station, is traditionally believed to have once extended for nearly three miles along the banks of the Rembyāra. Until some 15 years ago all subjects of the Mahārāja who wished to leave Kaçmīr by this route, had to show permits and to pay a small poll-tax at the police posts which were stationed at *Höṛapōr*, *Inganārī* and 'Alīābād Sarāi.

These posts were known in the official Persian by the name of

¹ For the phonetic change of Skr. *Krama*- > Kaçm. *Kām*- we have the evidence of an exact parallel in the well-known name for the western portion of the Kaçmīr Valley, *Kamrāz* < Skr. *Kramarājya* (*Rājat.*). The length of the vowel in *Kām*[el is easily accounted for by the assimilation of *v* to the preceding *m* (in the intermediate form * *Kramvart* reduced from * *Kramavart* under the action of the stress-accent which falls on the first syllable) and by subsequent 'supplementary lengthening'; for the latter comp. Kaçm. *Dānōtar* < Skr. *Dhanvantari*. Examples for Kaçm. *l* being the phonetic derivative of Skr. *r*+ dental are Kaçm. *āval*[un : Skr. *āvarta* 'whirlpool,' *mul*[mut : Skr. *mardita* 'rubbed.'

rāhdārī and have been frequently noticed in the accounts of European travellers since the early part of the present century. An interesting passage of Albērūnī (transl. by Sachau, I., 206) shows that in old times strict control was also exercised at such places over those who wished to enter the country.

The historical *data* which we have endeavoured to elucidate in connection with this ancient mountain-route, can claim, perhaps, only a locally limited interest. Yet their detailed discussion here may have been of some use as showing that we can expect *mutatis mutandis* in the mountains of Kaçmīr that tenacity in clinging to local traditions and local names which characterizes the population of so many parts of Alpine Europe.



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TO

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jābī, 291.

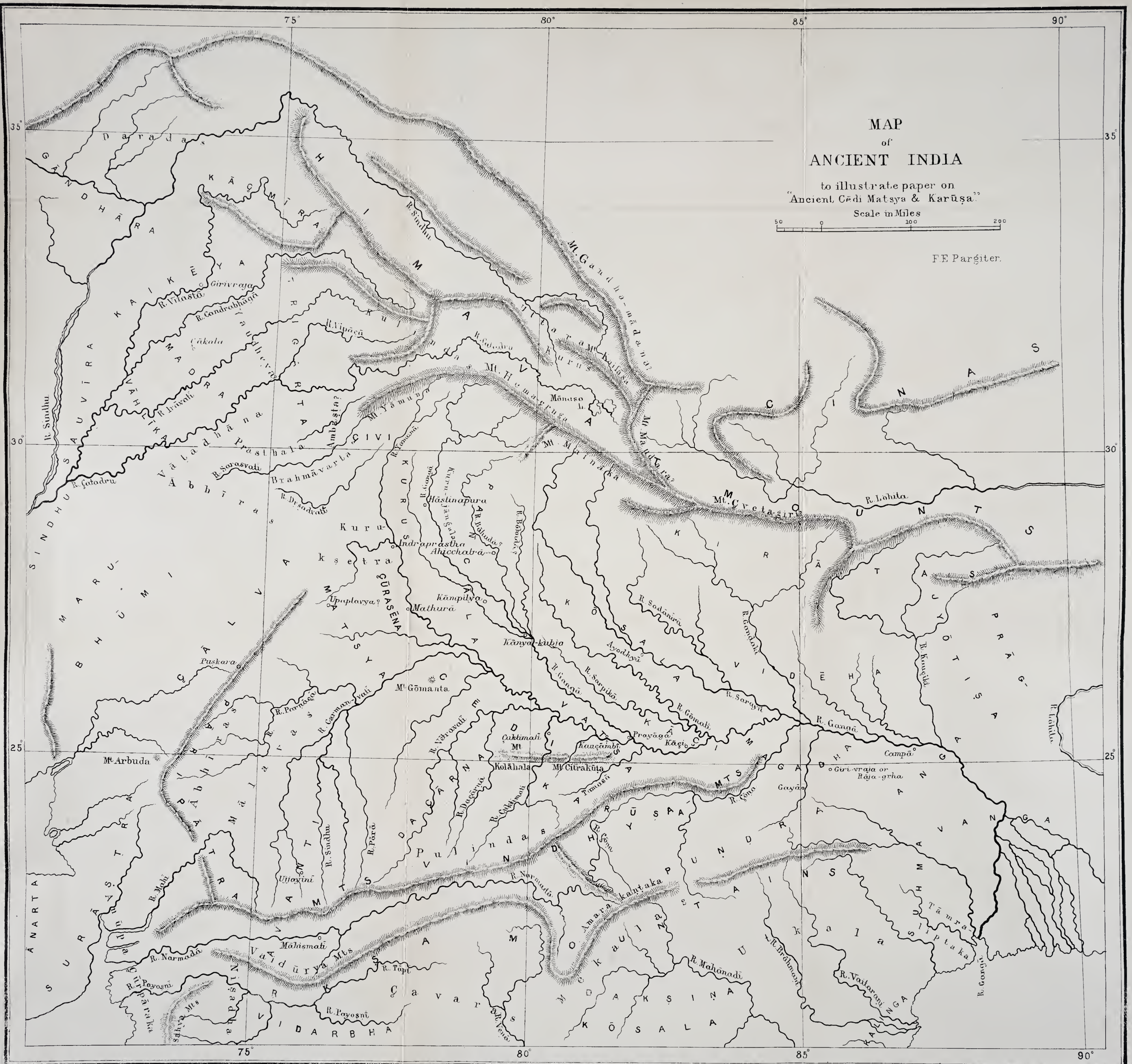
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ed, 158.

Yak found in Tibbat, 98.

Yam, district in Tibbat, 24 days from
Bengal, 106.

YŪSUF SHĀH, inscription of, 199, 223.

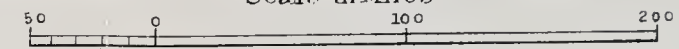
Zōnkah, a territory in Tibbat, 97.



MAP
of
ANCIENT INDIA

to illustrate paper on
"Ancient Cādi Matsya & Karūṣa."

Scale in Miles



F E Pargiter.





photo-etching.

Survey of India Offices, Calcutta, June 1895.

RARE MUHAMMADAN COINS.



Photo-etching.

Survey of India Offices, Calcutta, June 1895.



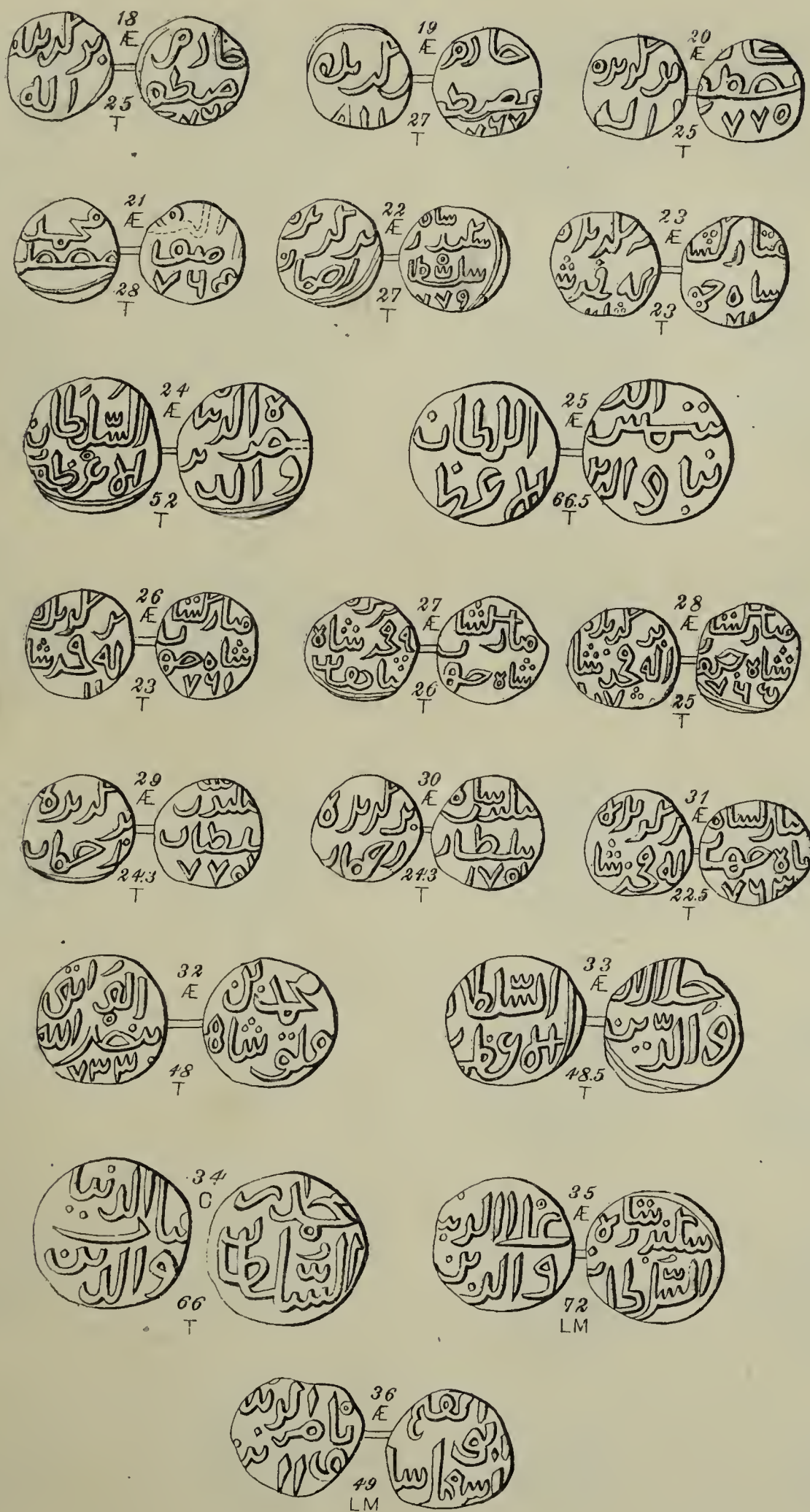




Photo-etching.

Survey of India Offices, Calcutta, June 1895.

COINS MINTED AT DÔGĀM.

श्रीगुरुकुमरीतिज्ञापानप्रणि
यत्तु कुमरीमहेश्वरप्रदासना

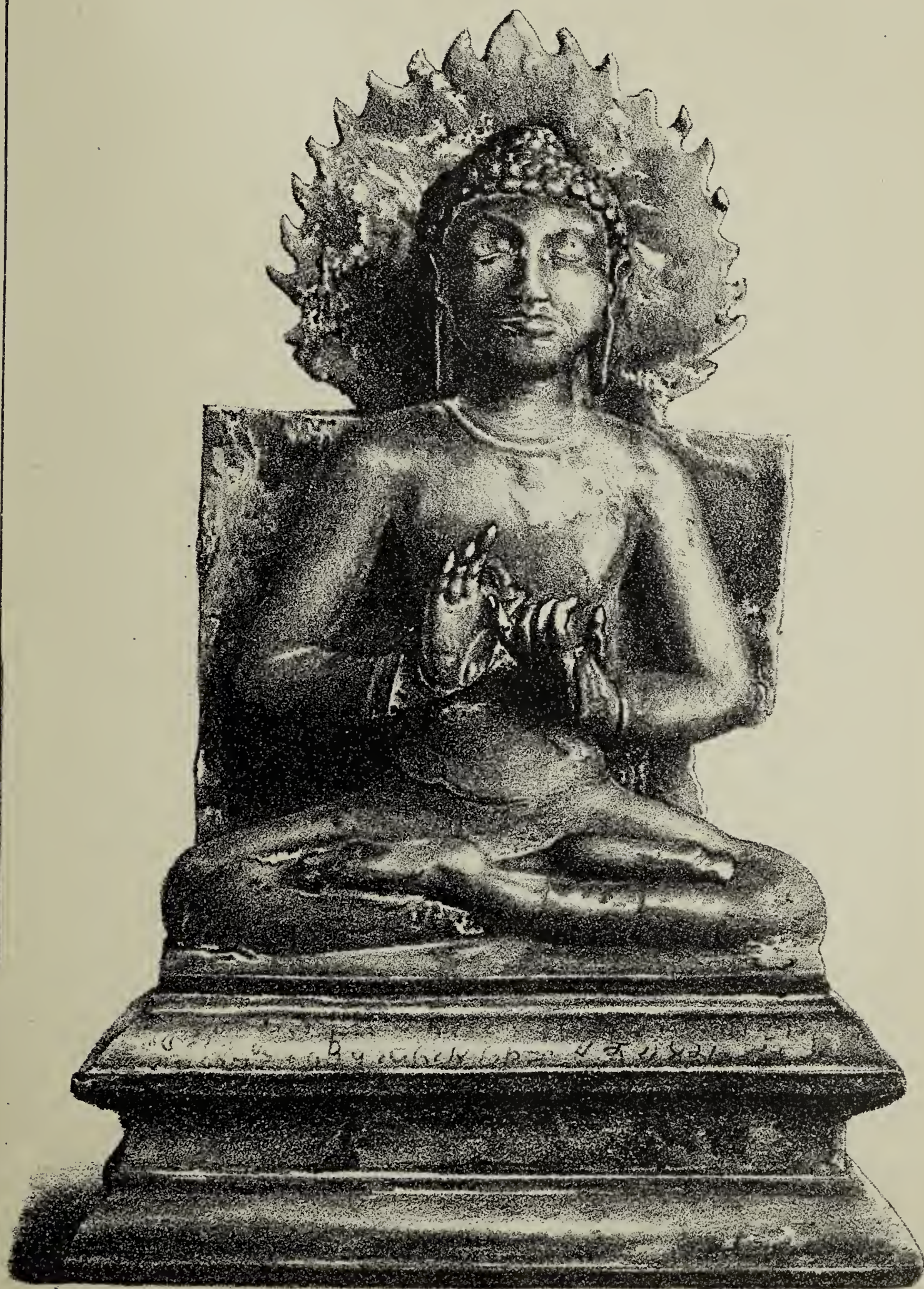
दायत्तकुमरीनागपानप्रिदा
पतिश्रीमदनपानभोगवाभ्याग

प्रदत्तैरुतिमवतवह्निवाङ्मारावगाविधयेत्तत्त्वानामानुप्रासिपयकबन्धुत्वादिम
धूमस्मिन्मुपानतश्रुतानदन्मस्ययाम्ममहिषपाकानमनेभ्रमप्रवरामसङ्गरान
शुक्लपीसङ्गभुमगायादितकनसवन्तवनिनेमनेमानानाद्याकनसगाकुनसप्रभृ
नावेनङ्गमङ्गनवभमपानमपिमीमात्रैर्वैद्वत्तैरुतिमसहितसवाद्यात्यन्त्रदायेनुभान
यकमनंफर्षयतादानमनवेकदय्याश्रुवृताजकनविकाविद्यामकर्तव्याश्रवरा
वाङ्माराङ्गमुक्तषादविकवाद्यादिसिंखस्रमताश्रुपवेनर्तश्रुमिदश्रुस्मृजानमना
कृशमनादीञ्चतिनाविभिपित्तमिषानेपाननीयमितिनुक्त्वात्तथिदुःप्रति
शृङ्गातिदयवत्तज्जमुदयकृतिउत्तातोप्रायकश्चागोतिदयतस्वभवाकिने
॥षड्विषमदस्यागित्वान्नवसुतिततिदः॥आहुतावावुक्तवताकु
वन्वकवामता॥उवसामककतामकान्नवाप्रककृन्तान्नवन्नवक
माज्ञानिदावदाकृतमज्ञवम॥सर्वाजनाज्ञावजःपाधिवञ्चान्नान्न
दादावतवामनङ्ग॥सामाज्याध्वंभूनिउहृपागाकान्नकान्नपाननी
दानवद्विद्विनिवह्नात्तामाराश्रीपवकहिदिवस्यजनम्मकादाश्यासुल्लि
ह्यनकादयवङ्गवदङ्गजाष्टश्रीवगानिचितगामजन्तुपगान्तानामङ्गम
नाश्याज्ञानापादानाश्वरान्नित्यनाउकमगावमिपदजादेदश्रीविन्दकर्मगा॥



Lith. by S. C. Mondul.

STATUE OF THE BUDDHA, FOUND AT DHANĒSAR KHĒRA, No 1



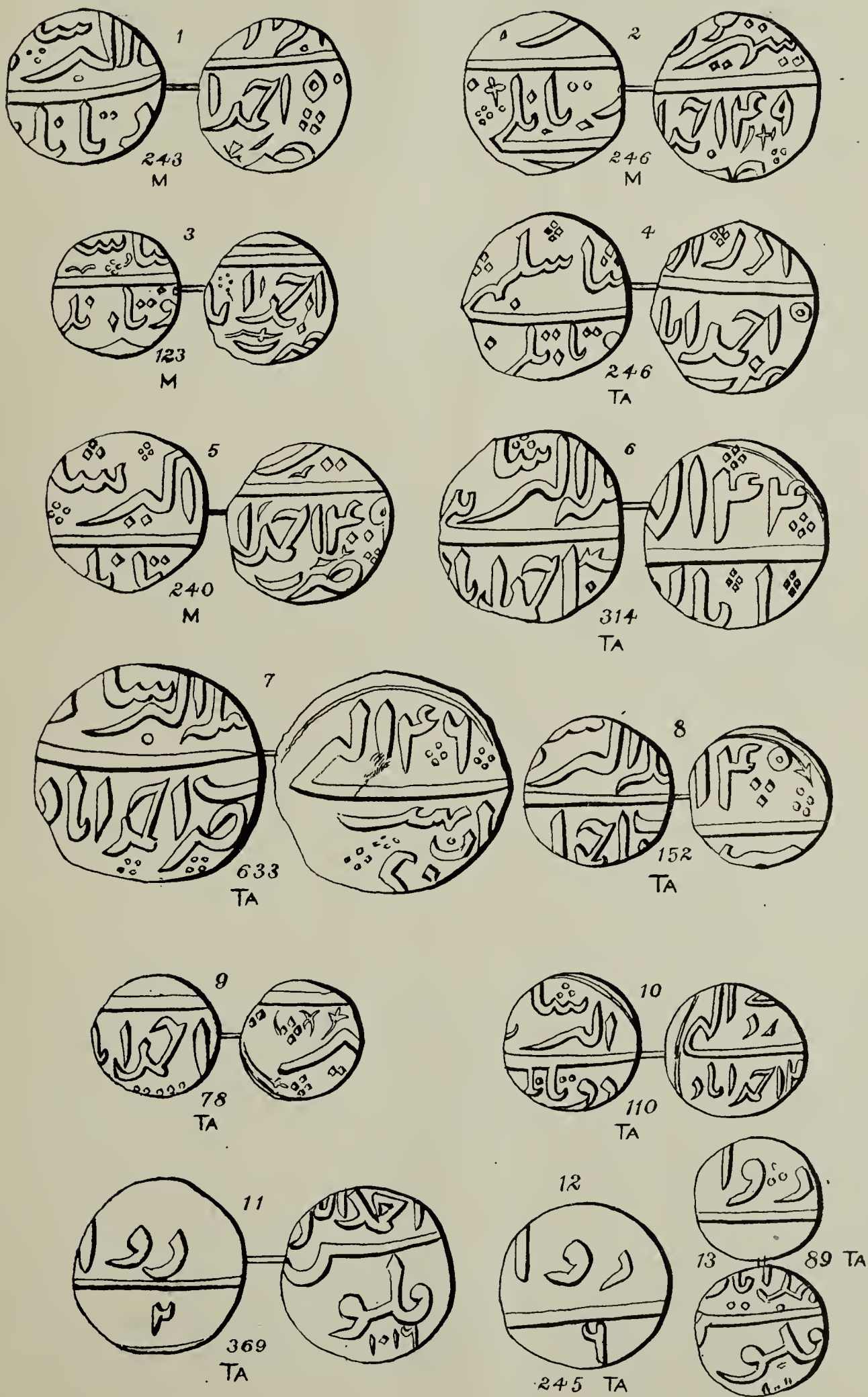
Lith by A. C. Chowdhary.

STATUETTE OF THE BUDDHA, FOUND AT DHANĒSAR KHĒRĀ, N^o. II.



Lith by A.C. Chowdhary.

STATUE OF THE BUDDHA, FOUND AT DHANĒ SAR. KHĒRĀ, N^o. III



C. J. Rodgers del.

A. C. Chowdhary Lith.

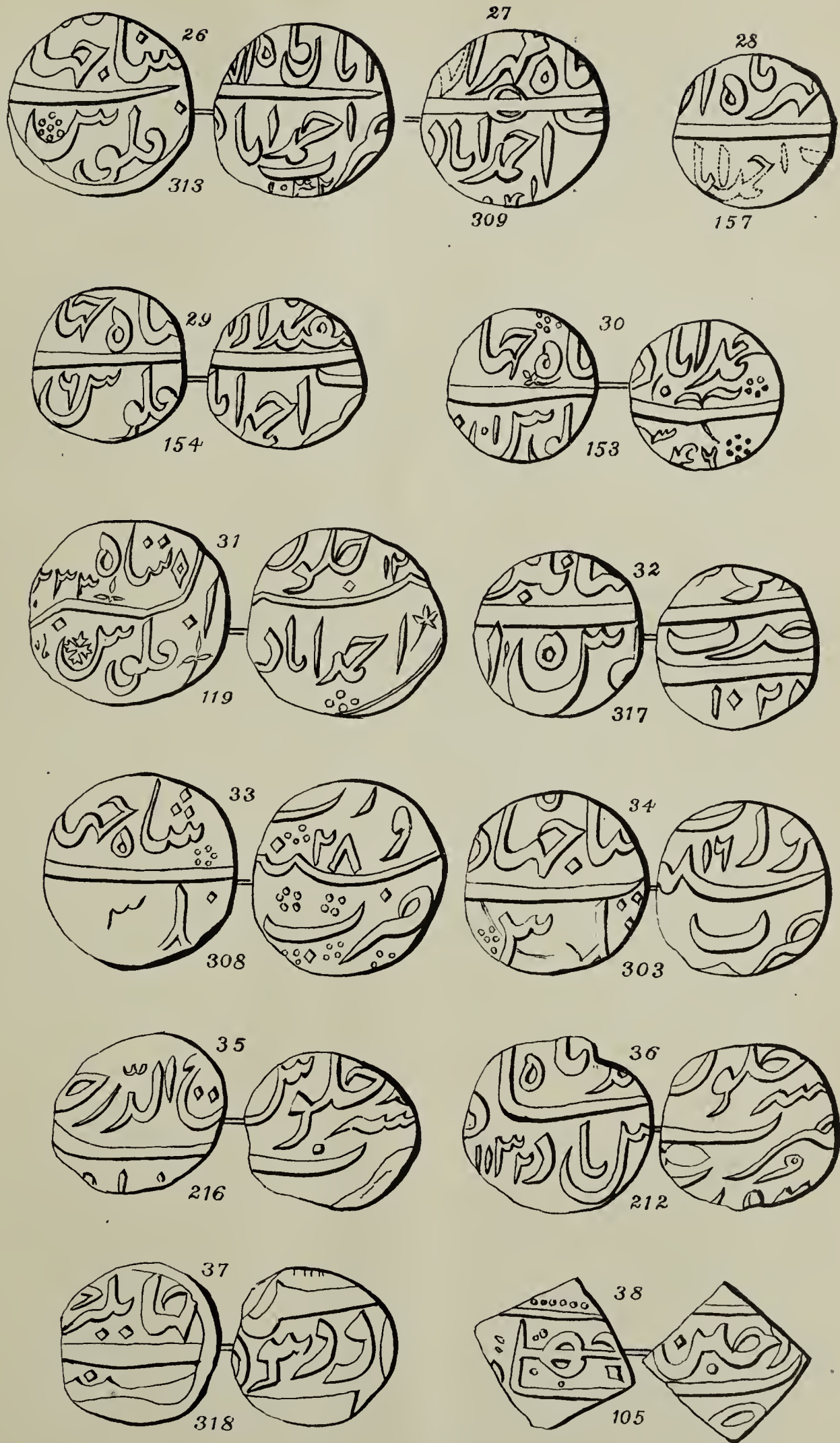
MOGUL COPPER COINS



C. J. Rodgers del.

A. C. Chowdhary Lith.

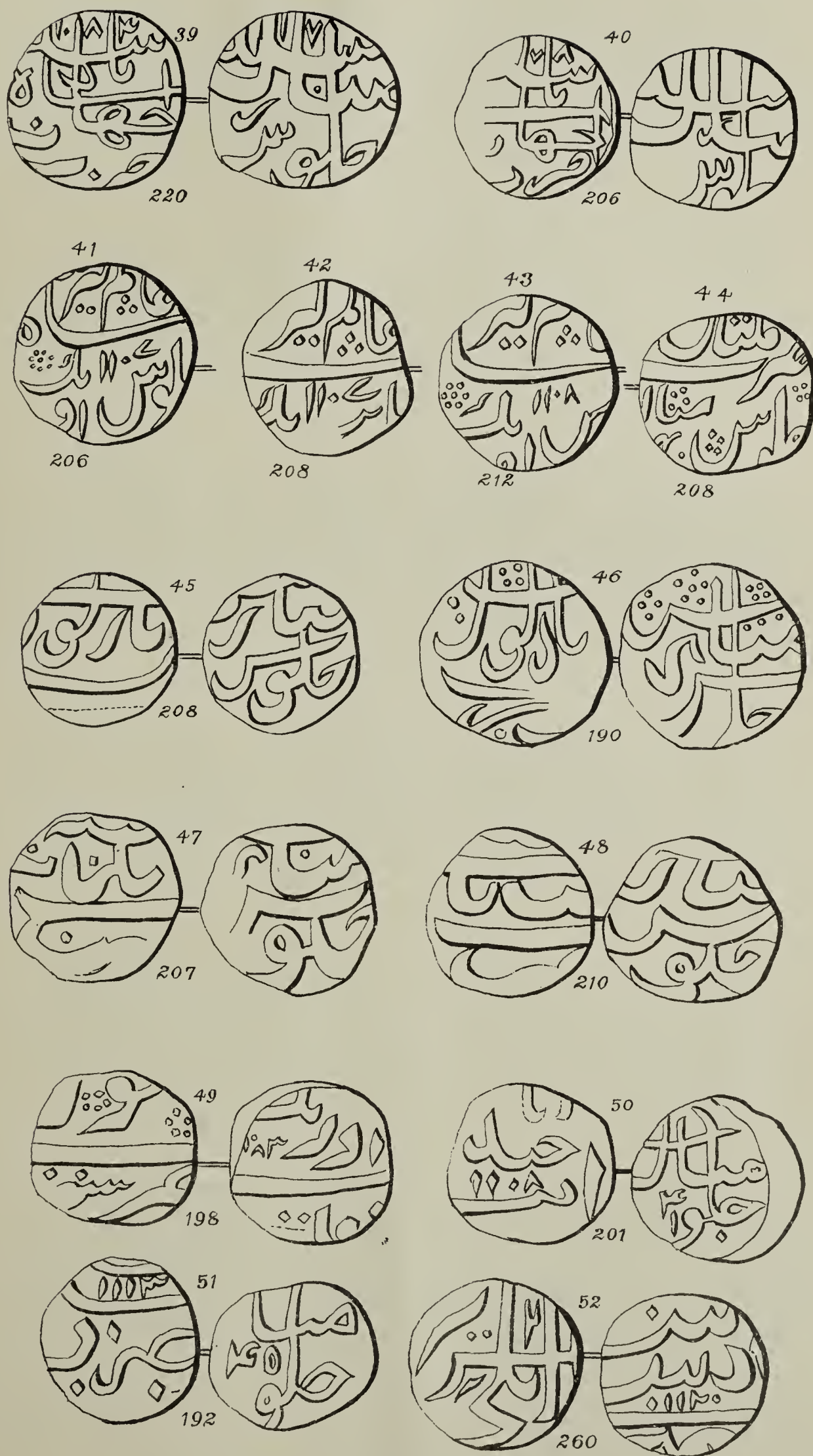
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A. C. Chowdhary Lith.

MOGUL COPPER COINS

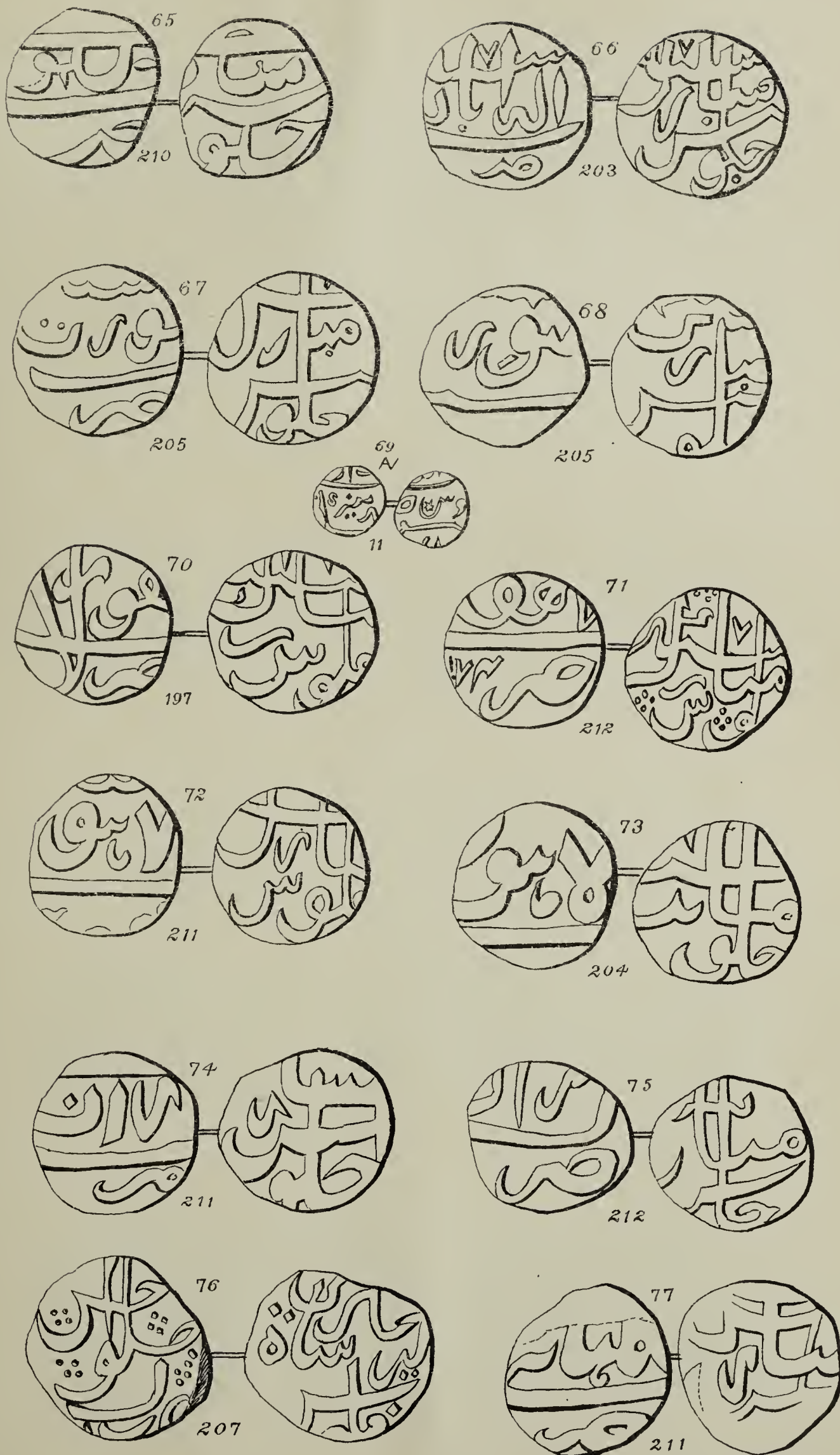




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A. C. Chowdhary Lith.

MOGUL COPPER COINS



C. J. Rodgers del:

A. C. Chowdhary Lith.

MOGUL COPPER COINS

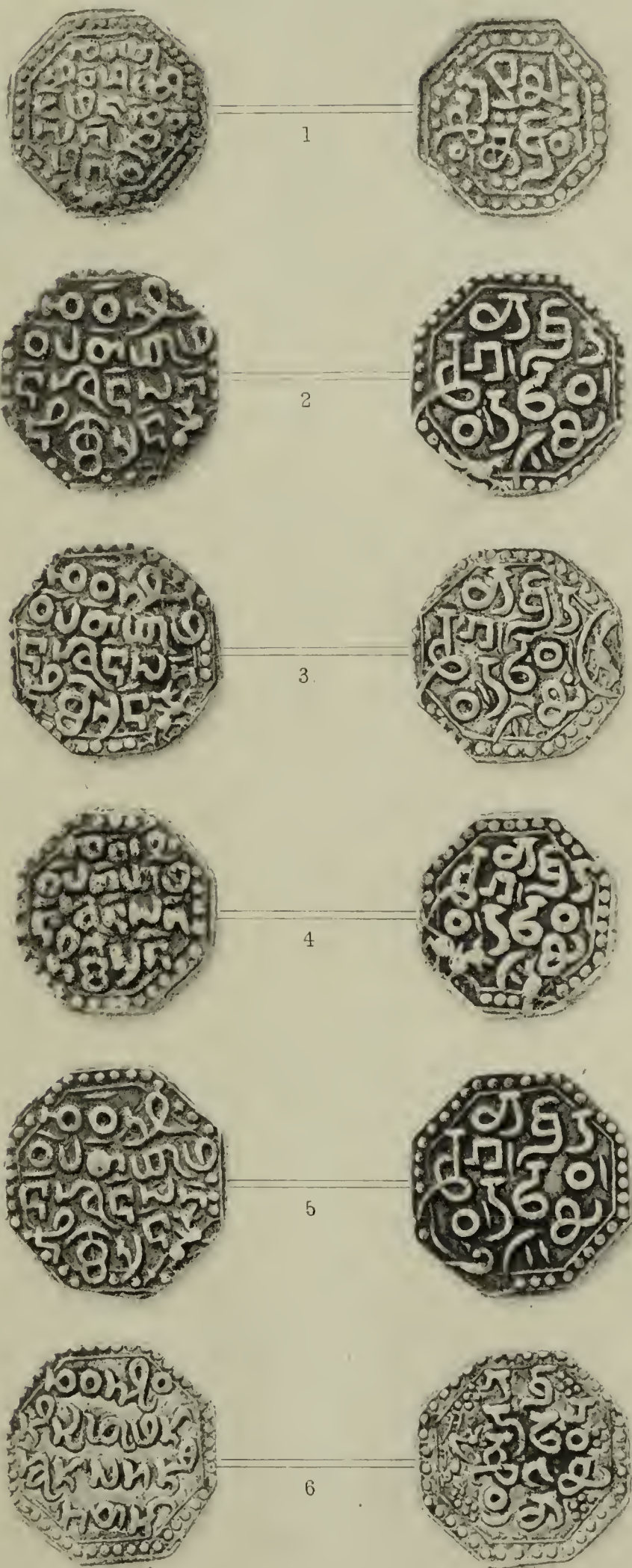






OBVERSES.

REVERSES.



AHOM COINS.

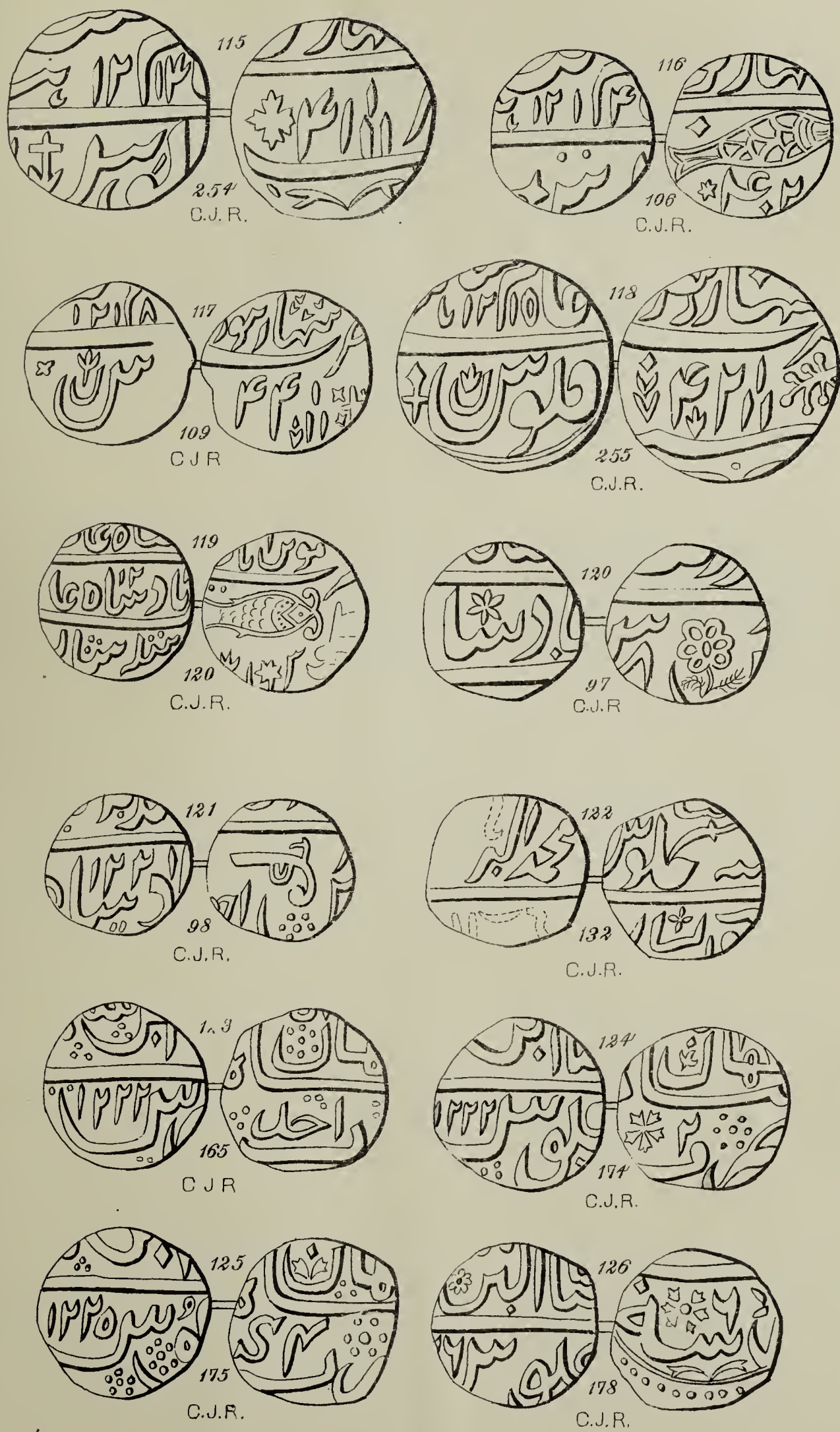
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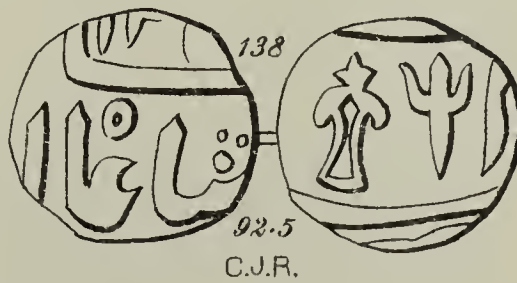
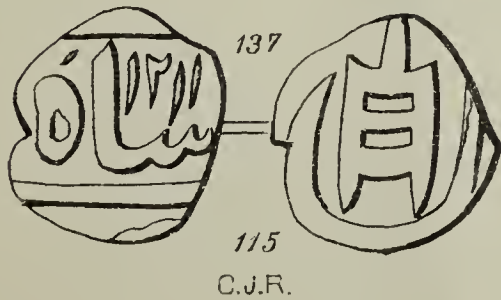
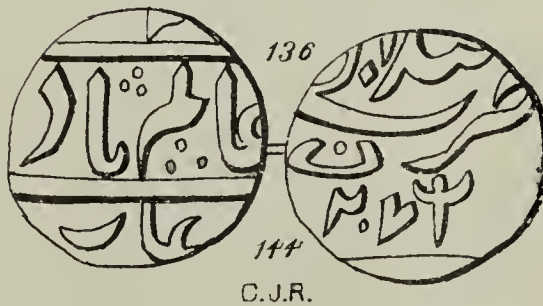
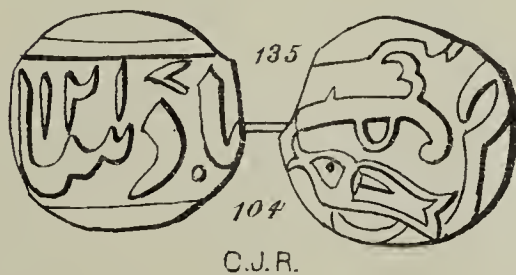
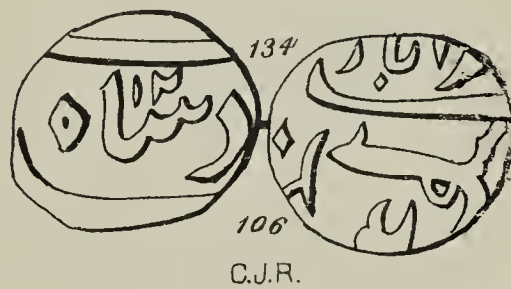
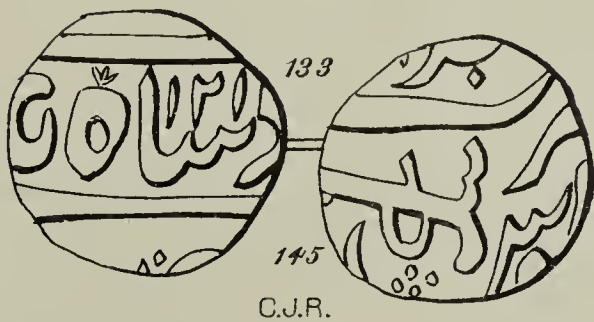
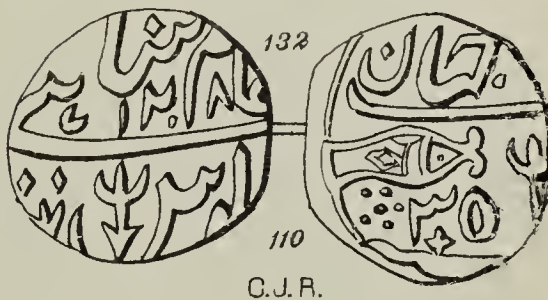
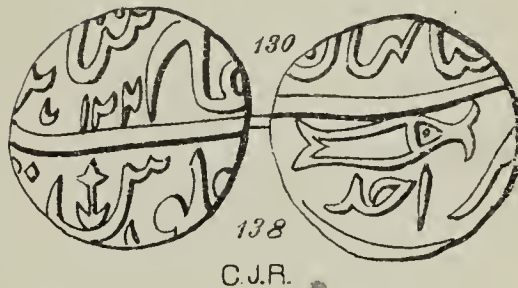
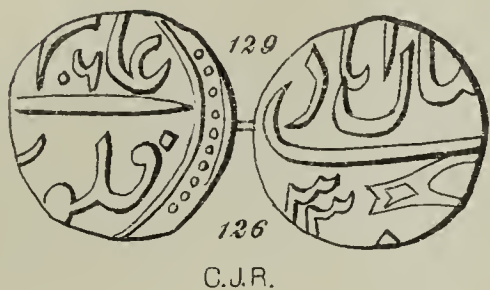
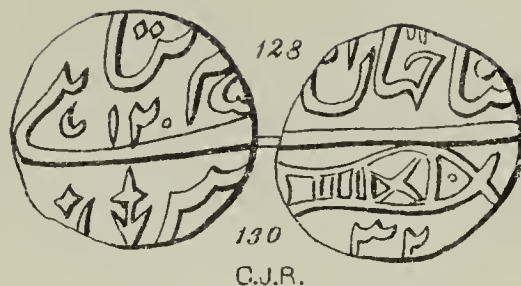
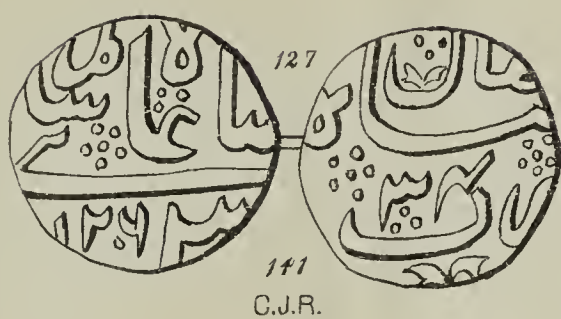
Number.	Do. as found in Serampur Version.	Characters in Serampur Version.	Do. in Modern Multani.	Do. in Modern Uci.	English Equivalent.	Notes.
1	୧	ୱ	ᳵ	ୱ	ā	Equivalent to alu. & can carry any vowel
2	୨	୧	୧ or ୧	୩	b	
3	୩	୩	୩	୩	bh	
4	୪	୩	୩	୩	p	
5	୩	୩	୬ or ୬	୩	ph	
6	୧	୩	୩	୩	t	Modern Ue hardly distinguishes t & ḍ
7	୨	୩	୩	୩	th	
8	୪	୪	୮	୮	ṭ	
9	୪	୬	missing	missing	th	
10	୧୦	୩	୧	୩	d	
11	୧୧	ୱ	ୱ	୮ or ୱ	ḍ	Trompp gives dy (I should rather say dj for its equivalent) and, says it is peculiar to Sindhi but this is not the case.
12	୧୨	ୱ	୩	୬ or ୬	ḍh	
13	୧୩	ୱ	ୱ	ୱ or ୱ or ୮	c	
14	୧୪	ୱ	୪ or ୱ	ୱ or ୪	ch	
15	୧୩	୩	୩ or ୩	୩ or ୩	j	
16	୧୧	ୱ	ୱ	ୱ or ୱ	jj	Trompp ṭ
17	୧୨	୩	୩ or ୩	୩ ୩	ny-	

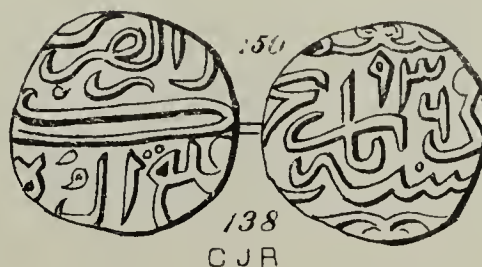
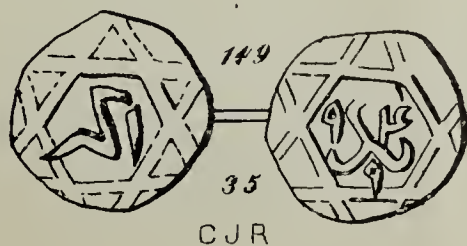
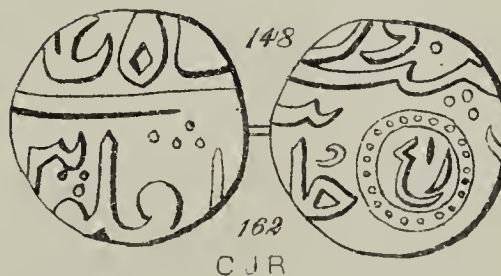
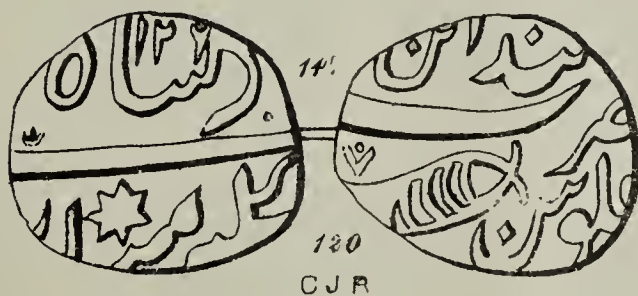
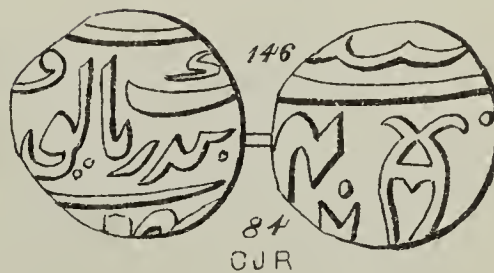
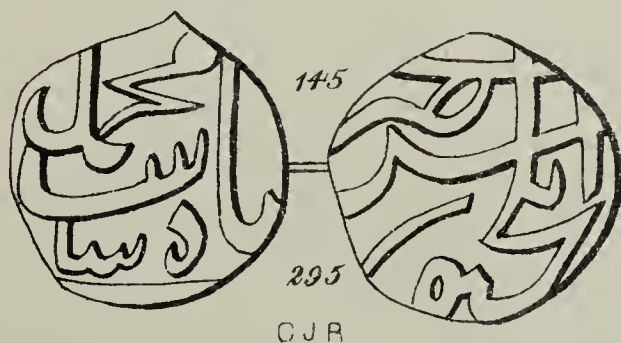
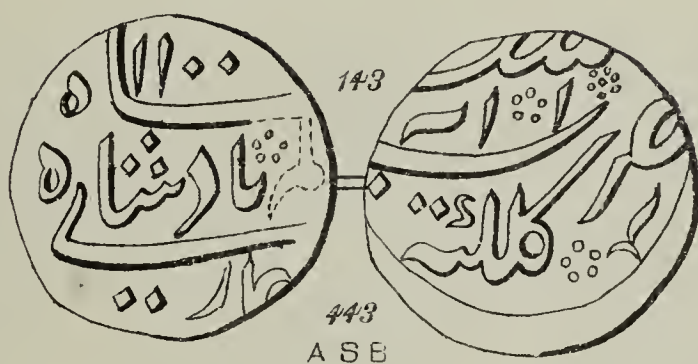
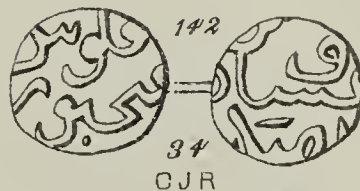
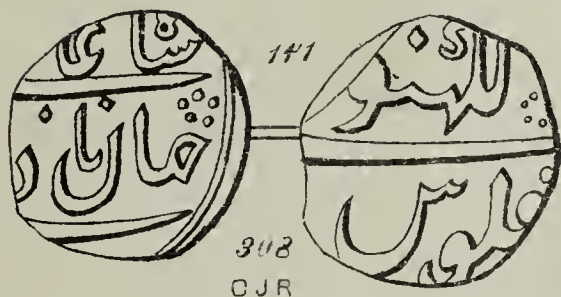
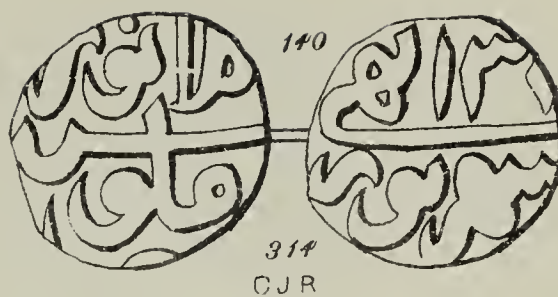
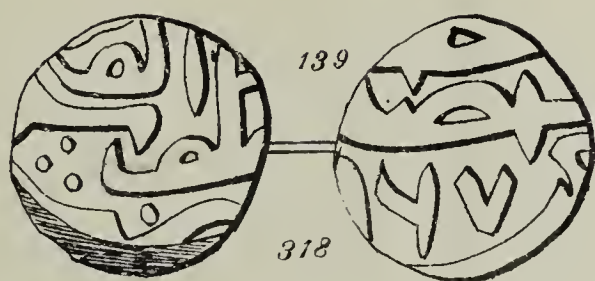
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WITH THOSE IN MODERN USE.

Number.	Do. as found in Serampur Version.	Characters in Serampur Version.	Do. in Modern Multani.	Do. in Modern Uci.	English Equivalent.	Notes.
18	৭৮	৪	৪	৪	r	
19	৭৯	৩	missing	missing	r	
20	২০	২	২	২	k	
21	২৭	খ	খ	খ	kh	
22	২২	খ	খ	খ	l	
23	২৩	ন	ন	ন	m	
24	২৪	৩	৮	৮ ৩	n	
25	২৭	১১	৭ ২	১১	n	Has sound of nr Trumpp ৩
26	২৬	৩	৫ ৫	৩	s	
27	২৭	১১	৩	৩ ১	g	
28	২৮	৭	৭	৭	gh	
29	২৯	৩	missing	১ ৩	tr	Trumpp ৩
30	৩০	১	১	১	h	
31	৩৭	৬	৬	৬	w	
32	৩২	৩	৩	৩	O or Ou	
33	৩৩	৬	১	৬ ৬	i	
34	৩৪	৭	missing	missing	y	
35	৩৭	৬	missing	missing		This does duty for 2 Sounds n (nasal) & the vowel ē or ai



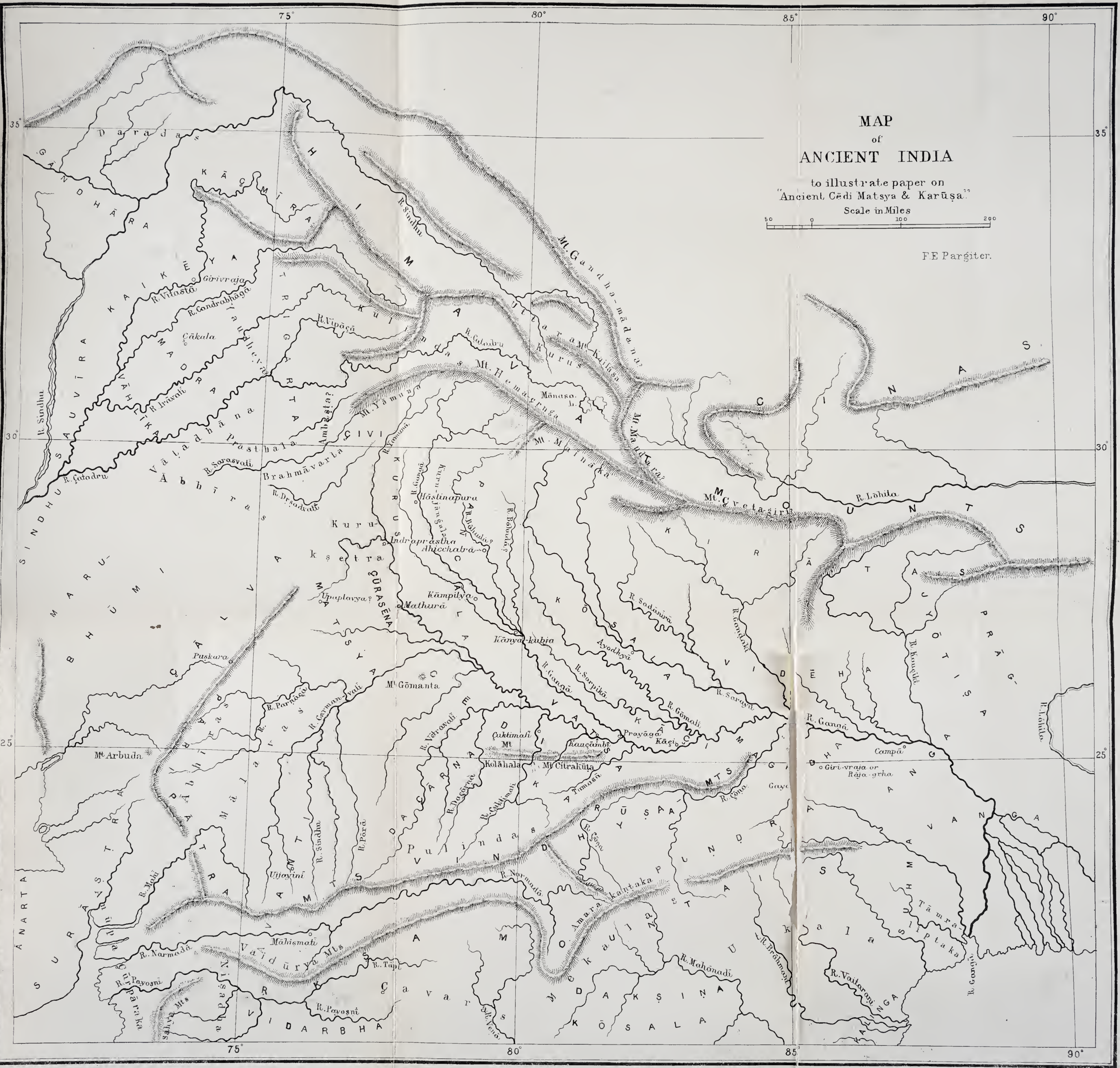








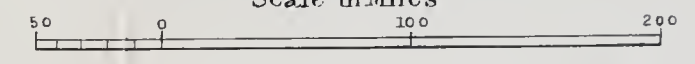




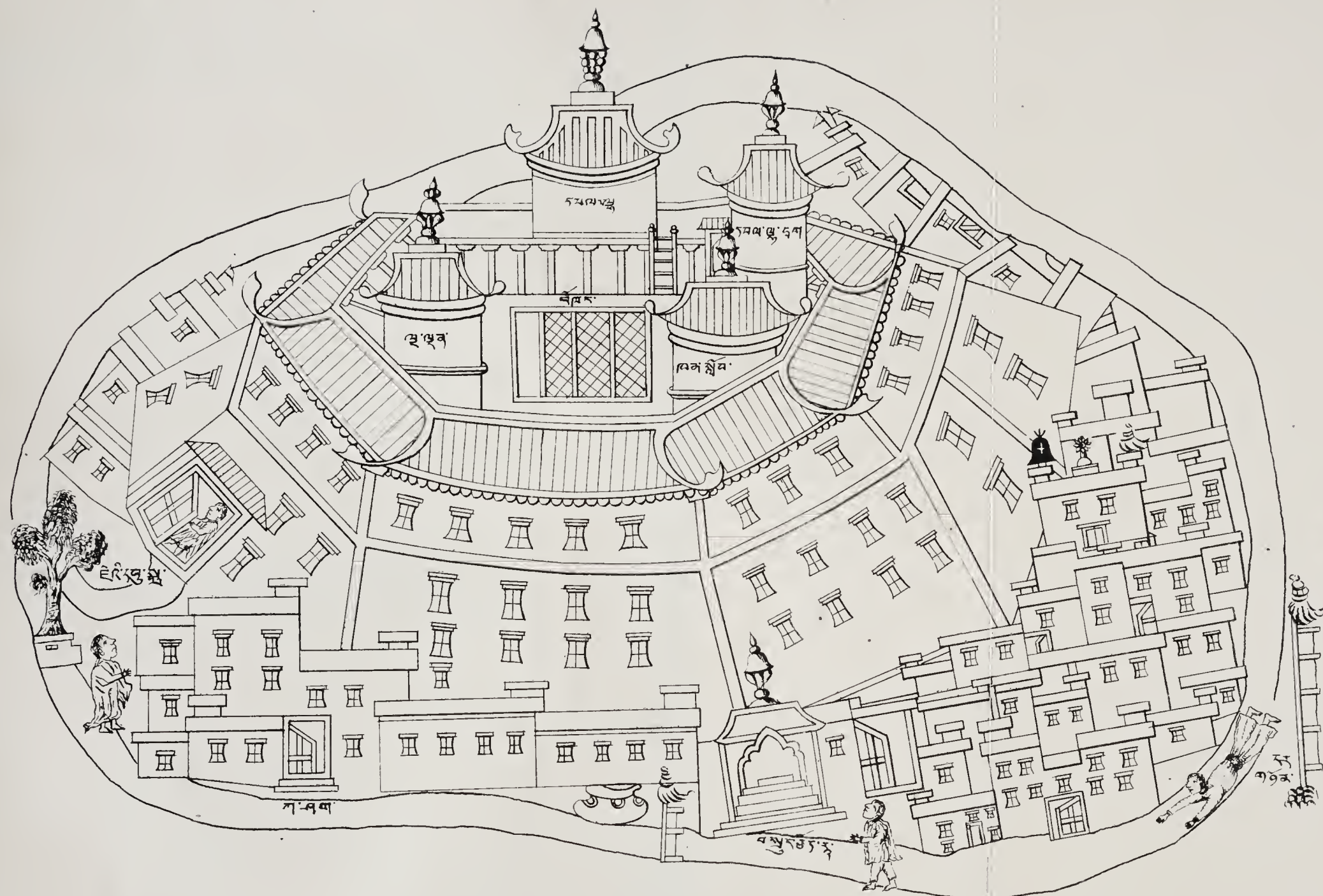
MAP
of
ANCIENT INDIA

to illustrate paper on
"Ancient Cēdi Matsya & Karuṣa."

Scale in Miles



F.E. Pargiter.



THE CATHEDRAL OF LHĀSA.
(From a Native Drawing)

JOURNAL
OF THE
ASIATIC SOCIETY OF BENGAL.

VOL. LXIV.

PART II. (NATURAL HISTORY, &c.)

(Nos. I to III.—1895.)

EDITED BY THE
NATURAL HISTORY SECRETARY.

"It will flourish, if naturalists, chemists, antiquaries, philologists, and men of science in different parts of *Asia*, will commit their observations to writing, and send them to the Asiatic Society at Calcutta. It will languish, if such communications shall be long intermitted; and it will die away, if they shall entirely cease." SIR WM. JONES.

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1896.

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<i>ii. The Physical Features of some of the Laccadive Islands,</i>	
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- No. II.—Containing pp. 139-298, with Plates III, IV, V, VI and VII, was issued on July 18th, 1895.
- No. III.—Containing pp. 299-555 was issued on February 1st, 1896.

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 <i>Physachæus ctenurus.</i>
 <div style="text-align: center;">,, <i>tonsor.</i></div>
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| ,, | <div style="display: inline-block; vertical-align: middle;"> <div style="display: inline-block; vertical-align: middle;">IV.—</div> <div style="display: inline-block; vertical-align: middle; font-size: 3em; margin: 0 5px;">{</div> <div style="display: inline-block; vertical-align: middle;"> <i>Inachoides dolichorhynchus.</i>
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JOURNAL

OF THE

ASIATIC SOCIETY OF BENGAL.



Vol. LXIV. Part II.—NATURAL SCIENCE.

No. I.—1893.

* *Natural History Notes from H. M. Indian Marine Survey Steamer 'Investigator,' Commander C. F. Oldham, R. N., commanding. Series II., No. 18.—i. The Topography of the Arabian Sea in the Neighbourhood of the Laccadives. ii. The Physical Features of some of the Laccadive Islands, with Suggestions as to their Mode of Formation.—By Commander C. F. OLDHAM, R. N.*

With Plates I & II.

[Received 15th September :—Read 7th November.]

i. *Topography of the Arabian Sea in the Neighbourhood of the Laccadives.*

SECTIONS AND TEMPERATURES.

Only in recent years has any exploration been made of the bottom of the ocean in Indian Seas, beyond the hundred-fathom line.

Before 1881, the hundred-fathom line, on the West Coast of Hindustan, was well sounded out by the officers of the Indian Navy, but no attempt had been made to define its limits in either the Bay of Bengal or Gulf of Martaban. Since 1881, the officers of the R. I. M. S. "Investigator" have yearly been employed, during the fine season, in surveying the coasts, sounding out to deep water, and taking-deep sea soundings and temperatures when making passages to and from the surveying ground. From the soundings and temperatures obtained in the Bay of Bengal, Commander A. Carpenter, in 1887, was enabled to write a paper

* Communicated by the Natural History Secretary.

on "The Mean Temperature of the Deep Waters of the Bay of Bengal."* Since then, owing to the survey of the Laccadives and the frequent passage of the "Investigator" past this group, a large number of deep soundings and temperatures have been accumulated in the Laccadive area. Advantage is now taken of these soundings to draw a chart shewing the contours in this region (see Plate I).

In the latitude of Bombay the hundred-fathom line is distant about one hundred and twenty miles, the soundings deepen seaward from the coast gradually, forming a shelf, which narrows on proceeding southward, until in the latitude of Cape Comorin it is only thirty miles broad.

The general slope seaward, beyond the hundred-fathom line, is from two to three degrees: it is broken occasionally by ridges or spurs of comparatively shoal water, and in latitude 11° N. a ridge, on which are situated the Elicalpeni Reef and Androth Island, projects for fifty miles to the south-west. In the Laccadive area the eleven hundred fathom line encircles the whole group, connecting the reefs at this depth with the neighbouring slope from the coast of Hindustan. Two tongues of deeper water narrow the connection with the slope from the coast, and an extensive tract of depths over eleven hundred fathoms occupies a position east of the Laccadives, on a line between the tongues.

The western islands and reefs are all situated on an extensive plateau of under a thousand fathoms, and are separated from the eastern by a narrow flat, averaging a thousand and twenty fathoms. The most northern of the group is a submerged reef, situated on the eastern side of a plateau of under nine hundred fathoms; the next two are also submerged reefs, rising from a similar plateau; south of these are three lagoon reefs, likewise connected by depths under nine hundred fathoms; and still further south are two groups each containing two reefs, and three isolated reefs, all rising from similar depths. The eastern reefs consist of three, namely, the two northern, situated on the ridge already mentioned as jutting out from the coast slope, and another island rising abruptly from depths of eleven hundred fathoms.

Minikoi, in latitude $8^{\circ} 15'$ N., sometimes spoken of as being one of the Laccadives, is separated from that group by depths of over twelve hundred fathoms, but has a submarine connection with the *Maldives* to the southward.

The outer slope from the plateau on which the islands are mostly situated is gradual, until the floor of the ocean is reached in depths a little over two thousand fathoms.

Soundings and temperatures obtained during the months of October

* J. A. S. B., Vol. LVI., Pt. II., 1887, pp. 230-232.

although in different years—the thermometers used being the Miller-Casella pattern, constructed by Cavy of London ; and the observations being corrected for the errors supplied from Kew Observatory—shew that the waters of the eastern part of the Laccadives, in depths over six hundred fathoms, are considerably warmer than the waters towards the Hindustan coast, and than those to the westward of the Laccadives.

On the plateau a temperature of 41° F. is reached at a depth of 905 fathoms, while the same temperature is met with at 790 fathoms on the thousand fathom line near the coast.

The bottom temperatures on the western side appear somewhat erratic, but with one exception they all tend to shew a higher temperature over the plateau than on either side. The surface temperatures vary from 77° F. to 83° F., the highest temperature being in the neighbourhood of the reefs.

The isothermal lines vary in depth to 400 fathoms, after which they are even to 600 fathoms, from 700 until the bottom is reached they dip downward in the centre owing to the warmer waters over the Laccadives.

A curve shewing the mean temperature at different depths from the surface to 1,300 fathoms, is shewn in black at Plate II. From the surface to 100 fathoms the curve depends on one series of observations taken every 25 fathoms ; from 100 to 400 fathoms, it depends on twelve observations at varying depths, and from 400 to 1,300 fathoms, the curve is the mean result of fifty-six observations : all these observations were taken in the months of October, November, or April, at the change of the monsoons. The curve shewn in red on the same figure is taken from Commander Carpenter's paper on the mean temperature of the deep waters of the Bay of Bengal. It is derived from observations taken during the fine season—November to May.

The Arabian Sea curve to 100 fathoms depends on so few observations that it is not desirable, up to this depth, to make any comparison with the Bay of Bengal curve. Beyond 100 fathoms, where the observations are numerous, it will be noted that there is a difference of about one to two degrees ; the Arabian Sea on the west coast of Hindustan in October, November, and April, being that amount warmer than the Bay of Bengal. At a depth of 1,300 fathoms the two curves coincide.

Sections of some of the Laccadive islands and reefs—the direction of the sections taken being generally at right angles to the length of the islands—show that the under-water slopes vary from 10 to 27 degrees, and that the slopes of the lagoon islands are rather steeper than that of reefs, at *Betra Par* and *Peremul Par*. At *Kardamat* the bottom

slopes 19 degrees each side: *Kiltan* has a slope of 23 degrees on the west side and 27 to 10 degrees on the east: *Chitlac* has the steepest slope on the east side, namely, 27 to 10 degrees, and 13 degrees on the west.

The sections of *Kavaratti* and *Agatti* are very similar, they have both a slope of 13 degrees on their west sides, and a more gradual declivity on the east sides.

In *Peremul Par* and *Betra Par*, which are lagoon reefs, the slopes vary from 14 to 16 degrees in the former, and 10 to 20 degrees in the latter.

From the above it will be seen that the narrowest atolls, *viz.*, *Kardamat*, *Kiltan*, and *Chitlac* have the steepest slopes.

The under-water slopes beyond the two-hundred-fathom line would appear to depend principally on the shape of the peak on which the atolls are situated.

ii. *The Physical Features of some of the Laccadive Islands, with Suggestions as to their Mode of Formation.*

The Laccadives (see Plate I), a group of coral atolls and reefs, lying from one hundred and twenty to two hundred miles from the West Coast of Hindustan, extend from Latitude 10° N. to 14° N., and Longitude 71° 30' E to 74° E.

This area contains four subnerged coral reefs, six coral reefs with sand cays, or small uninhabited islets, and eight inhabited atolls. Five of the atolls and three of the reefs were examined during the visits of the "Investigator" in October and November 1892-93-94; and are described in the following notes:—

Kiltán Island is two miles long N. N.-W., and S. S.-E., and a quarter of a mile broad, having a shallow lagoon on its side. The highest part of the island, which is about 25 feet above high water-mark, lies on the eastern side: from here there is a general slope downwards to the lagoon, its north and south extremes curving slightly to the westward. In places, ridges of coral and coral-sand stretch along in the direction of its length, breaking the general slope lagoonwards.

The island is formed of coral sand, coral sand rock, and broken fragments of coral reef rock, overlying a hard conglomerate composed of fragments of reef corals. The coral-sand rock may be seen exposed on the lagoon beach of most of the Laccadive islands; it is of a friable nature, but its surface becomes very hard when exposed to the air. Most of the houses are built of blocks of this stone, which are cemented together with *chunam*. Good water is obtained by sinking wells until the conglomerate reef rock is reached.

On the eastern shore the beach is composed of broken boulders of reef corals and comminuted fragments. On this side the reef extends a hundred yards from the beach, and then goes off into deep water; the reef does not dry, and a boat in fine weather can always pass over it and ground on the beach off the ends of the island; shallow water of 5 to 7 fathoms extends over half-a-mile. The lagoon appears to be 6 to 8 feet deep, and has two openings to it through the reef. These openings would soon close by the growth of the coral did not the natives periodically clear the passages.

The island appears to be extending lagoonwards, by the accumulation of coral sand washed from the reef; its extremes are also being added to by the sand and *débris* washed up by the currents. Its surface is thickly planted with coconuts, jungle being found only on the extremities and where the island has extended lagoonwards.

Mention has already been made of the reef on the eastern side of the island; that on the western side is different in character, being a reef a-wash at low water, which extending from the extremes of the island, encloses the shallow lagoon. Owing to the weather no examination was possible, but viewed from seaward it appeared to be formed of coral in vigorous growth: the soundings obtained shewed a gradually increasing depth from the reef to the 20-fathom line, where it drops into deep water.

Chitlac Island extends N. N.-E. and S. S.-W. $1\frac{3}{4}$ miles, and is about one-third of a mile broad. Like Kiltán it forms the eastern side of a coral atoll. Ridges and mounds of sand and coral were observed in different parts, the highest mound being about 30 feet above high water. On the eastern side, inside the beach, is a long narrow depression. The eastern beach is covered with big boulders of reef corals. The fringe reef extends 20 to 30 yards from the beach, uncovers at low water, and has growing coral at its edge; its surface being strewn with coral *débris*.

The north point of the island extends about 200 yards beyond the coconut plantation, and curves towards the lagoon; the first 100 yards of this extension is covered with littoral plants, the last part with large boulders of coral broken off the fringe-reef, which here is very narrow. Sand has been washed up and has accumulated amongst the boulders.

The north point of the island has altered in appearance since the last survey in 1848. At that time, an island existed off the north end, which at present is connected to the main, and covered with bushes. The natives report that the connection was made in November, 1891, during a storm from the N.-E.

The reef enclosing the lagoon has two openings through it, that to the northward being broad and shallow with numerous patches of growing coral. An examination with a water-glass shewed that, off the eastern and southern sides, coral was growing in 5 to 7 fathoms, and everywhere off the western side of the atoll it appeared to be growing luxuriantly. An attempt was made to collect some, but owing to defective means none was obtained; the grapnel sent down, after catching several times and bringing nothing up, eventually caught a large mass of madrepore, and was lost.

Inside the lagoon, and in the northern entrance, numerous patches of *Porites*, Madrepore, and blue coral were growing, except towards the south end where the bottom is principally coral sand. The absence of live coral towards the south end is no doubt due to the reef here being almost continuous, preventing the current and tides from supplying food, and the coral being killed by the accumulation of sand washed from the reef. In all parts where the tide ebbed and flowed live coral was observed.

Good water is obtainable on the island, and as in Kiltán, is no doubt the drainage from the soil resting on the conglomerate coral rock.

I found several pieces of volcanic rock, and a green stone on the north end of the island; they were said by the natives to have been brought from Byramgore Reef, where a steamer with stone ballast had been wrecked.

Kardamat Island extends $4\frac{1}{2}$ miles N. N.-E. and S. S.-W., with an average width of about a quarter of a mile. Like Kiltán and Chitlac it is situated on the eastern side of an atoll, and forms about one-third the circumference. The centre of the island, and oldest part, is well covered with coconuts. It seems to be formed principally of blown sand overlying coral-sand rock. The latter can be observed in many places on the lagoon edge; where it is exposed between high and low water, it generally dips at a slight angle towards the lagoon.

The extremes of the island carry a scanty vegetation of jungle 6 to 8 feet high, but attempts are being made to grow coconuts over the whole island.

The northern point of the island is formed by a spit of sand on which I found a quantity of pumice, extending inland for about fifty yards from the extreme point; it is strewn all over the surface, and varies in size from a marble to half a foot in diameter.

Although there is a large quantity on the point, it is not more than is frequently found washed up on coral islands in other parts of the world, where, as is the case at Kardamat, the currents are favourable

for collecting and washing up whatever may be floating in the neighbouring seas.

This pumice was first noticed by the surveying officers during their visit in the autumn of 1892, and is mentioned by Dr. Alcock in his Administration Report for that year.

The south extreme of the island is a sandy point along which vegetation is gradually creeping as the point extends.

The fringe-reef which fronts the eastern edge of the island is narrow, and has growing coral on its edge, only the surface of the reef being encrusted with Nullipore, or cemented into a reef flat.

The remaining part of the atoll, not occupied by the island, is a coral reef, awash at low water, the only openings being to the N.-E., and very narrow. In consequence, there is very little live coral within the lagoon, the most notable patches being in the neighbourhood of the entrance and towards the western side, opposite the centre of the island. The lagoon is from 2 to 6 feet deep.

The soundings shew that the bottom slopes steeply on both the east and west sides of the atoll, from about 20 fathoms into deep water, but towards the N. N.-E. and S. S.-W., the direction in which the atoll soundings shew a much more moderate slope, there is a depth of 272 fathoms at two-and-a-half miles from the north point, compared to 500 fathoms at one-and-a-quarter mile from the east side, and 730 fathoms at one-and-three-quarter mile from the west side of the atoll.

Betra Par. This is an atoll six miles north and south, and three miles broad, with an islet on its north-east end, and two sand cays joined by patches of sand, on its eastern side. The islet is nothing but a sand cay, covered with coconuts, extending nearly half-a-mile along the reef. Its inner side, which is washed by the waters of the lagoon, is probably the oldest part, as it carries the tallest coconuts; here the sea is encroaching, the roots of the trees are exposed, and several have fallen. The north-east side of the islet is formed by a shallow bay in which are several slabs of coral-sand rock, which jutting out beyond the line of the beach shew that that part of the beach has been washed away. The extremities of the island are increasing in the direction of its greatest length.

The encircling reef dries nearly everywhere at its edge at low water springs; it is broadest on the eastern and southern sides, and has only one opening through it, just south of the islet.

I examined the northern and western sides of the reef, and the other surveying officers visited the other portions. The middle of the western side is about 250 yards broad, and on the extreme western

part is an iron band boiler which must have been part of a wreck; it is embedded about one foot and lies completely on the reef, so that at low water I was able to walk round it. Two clumps of coral about one foot in diameter were growing on its outside, and several smaller inside.

The reef here dries about one foot at low water and is covered with live coral. Of the latter the branching Madreporas were the most common, but a *Porites* and Brain-coral were also numerous.

The north side of the reef is the narrowest; it dries 3 feet at low water, is about 100 yards broad, and is composed of piled up coral, broken off the growing edge.

Inside the lagoon the average depth is from 3 to 4 fathoms. Here are numerous coral clumps awash or dry at low water. I examined two of them and found that coral was growing on the sides, but the top was dead, and covered with Nullipore.

Inside the reef, from the islet round the western side to the sand cays on the south side, is a remarkable broad shelf with about half a fathom water over it, formed of dead coral and sand, the coral being in a state of decomposition.

This shelf is about half a mile broad on the north-west part, increasing as the width of the growing reef increases, and reaching a width of one mile to the southward. On its inner side it drops suddenly into the general depths of the lagoon which I have already mentioned as being from 3 to 4 fathoms.

I think that this shelf may be accounted for on the supposition that the coral reef commenced to grow at the inner edge of the shelf, and has worked seaward, leaving behind it a reef-flat, which is kept at its present level by sand and *debris* being washed in from the outer edge, and by the solvent action of the sea-water. The eastern side of the atoll, not being so favourably situated as regards the currents and tides, has not grown seaward sufficiently and rapidly to leave a reef-flat behind; it is here also that sand and *debris* collect which would also assist in retarding the growth of the coral.

The soundings shew a fairly corresponding slope on all sides, from the edge of the reef out into deep water.

Peri Mul Par. This reef, which only dries at low-water springs, is somewhat crescent shaped, the concave side being open to the northwest. Its longest diameter is seven miles, and its width four miles. The edge of the reef shews at low water, but at high water and in smooth weather it is difficult to distinguish, and in many places does not break. The encircling reef is very narrow, and I am informed by the officers who examined it that it is only growing at the outer edge.

Inside the reef, and extending towards the centre for about one mile, all round the south west and north sides, is a shallow flat or shelf with depths over it of under one fathom. It consists of sand and broken coral, and seems, as in Betra Par, to be formed by the seaward growth of the reef and the dissolving action of the sea-water. Inside this reef-flat the depths are from 3 to 6 fathoms, the centre part containing ridges of coral which run N. N.-W. and S. S.-E.; towards the N.-E. side there are fewer coral-heads, and here are several good boat entrances.

At the N.-E. corner of the atoll is a small sand cay with coral boulders piled up on its eastern side. Patches of sand, which shew at low water, are also found on the eastern side of the atoll.

From the appearance of the reef, the reef-flat, and the soundings, it is evident that the reef is growing westward and southward at a greater rate than in other directions.

Kavaratti. Like the other eastern atolls of the group, consists of an island, with a coral reef on its western side enclosing a shallow lagoon. The island is $2\frac{3}{4}$ miles long N.-E. and S.-E., and three-quarters of a mile broad towards its north end, narrowing to about a cable half a mile from its south extreme. The coral reef forming the lagoon runs parallel to and is about six cables from, the beach, it is awash at high water near the north end, but covers nearly half a fathom about the centre.

On the lagoon side the island has sand hillocks 15 to 20 feet high, lining the beach for about half the length of the island from the N.-W. extreme; in the centre of the island is a fairly level area, the land sloping up gently as the eastern beach is approached.

The beach on the N.-E. side is strewn with large coral boulders; the eastern beach is exceedingly steep, with a narrow fringe reef. The natives of this island seemed better off than in most of the Laccadive islands; they own several large boats which trade with Cochin.

A comparatively wealthy and intelligent native who had lived here all his life was questioned as to changes that had occurred in the configuration of the island. According to him the most frequent gales are from the south west, when large quantities of sand are blown up and deposited on the western side of the island, only to be washed away by the currents and winds of the other season. Good water is obtained from wells about 10 to 12 feet deep, formed by cutting through a thin stratum of coral rock below which the fresh water seems to lodge.

Agatti (Aucutta) group, comprises two atolls situated N.-E. and S.-W. of each other towards the extremes of an extensive plateau carry-

ing from 5 to 10 fathoms on it, which inside the 100 fathom line extends from 15 miles and forms a slight curve, the convex side to the N.-W.

The southern atoll has the island of Agatti situated on its eastern side; a broken coral reef forming a shallow lagoon extends in two arms, like claws, from its north and south extremes, leaving a good entrance for boats between. The island is four miles long by half a mile broad, its greatest breadth, as in Kavaratti, being towards its north end, narrowing to a point to the southward; a narrow shallow channel separates the south point from the small island of Kalputhi. On the western and southern side of the island a long line of coral-sand rock is exposed on the beach, as though the preceding south-west monsoon wind had removed the loose sand in the neighbourhood; also towards the south end a line of it is visible in the lagoon thirty feet from the shore, while on both sides of the sandy spit forming the south point broken and dead branches of the bushes lie on the spit. Towards the north and north-west, where the island has its greatest breadth, the lagoon beach is being added to, and coconut trees are being planted: in fact, the whole of the north end is very level, and leads to the idea that it has been comparatively recently formed by the deposition of sand from the reef and southern part of the island. The eastern side is steep too, with a narrow fringe-reef. Kalputhi is situated to the south of Agatti and is formed of coral rock and sand; its northern point extends in a, sandy spit towards Agatti.

The northern atoll extends five miles east and west, and has an average width of two-and-a-half miles. The coral-reef enclosing the lagoon is somewhat rectangular in shape, and is continuous, except on the western side, where there is a broad shallow entrance; in the centre is the island of Bungarra, and two other islands and some islets are situated towards the eastern side of the atoll; they are all very low and level, and no fresh water is obtainable; as at Betra, they appear to be merely sand-cays covered with vegetation. Bungarra, the centre islet, shewed signs of being washed away on its north and west sides, the coconuts on these sides having fallen and lay rotting on the beaches. The central portion of the lagoon is full of coral heads, with 2 to 4 fathoms of water between, but all round the inside of the reef is a level flat, similar to the flat at Betra and Peremul Par; it has an average width of one-third of a mile, except on the south side, where it attains a width of about three-quarters of a mile. Flood tide was found to set S. S.-E., ebb N. N.-W.

Off the western side of Bungarra, and extending out towards the entrance, are two long sandy arms which curve round towards each other and dry; they are probably formed by the deposition of the sand

during ebb, as follows—as soon as the level of the lagoon during ebb has fallen to the level of the encircling coral reef, the remaining waters have to escape by the channel on the western side; the current then is strong, and the island lying in the track, it rushes past with considerable velocity; the waters of the lagoon are filled with sand carried in during flood, and the eddy currents deposit this sand on the western side of the island, forming the two spits. From the soundings and the appearance of reef and reef-flat it seems probable that the reef is extending southward more rapidly than in other directions.

Suheli Par, of an oval-shape, extends nearly nine-and-a-half miles N. N.-E., and S. S.-W., with a width of about three-and-a-half miles. A very narrow fringe reef, broken to the N.-W., encloses a lagoon with depths of 4 to 7 fathoms in it. The S. and S.-E. sides of the atoll are occupied by a shallow sandy flat similar to the flats in Betra, Peremul, and Bungarra reefs. The reef flat extends along the east side to the north extreme, but is much narrower here than on the S. and S.-E. sides.

Two islands are situated on the reef-flat, one on the extreme north point, and the other three-quarters of a mile from the edge of the reef on the south-east side of the atoll. They are both very low and level; and like the islands at Betra and Bungarra are sand-cays, covered with vegetation. The northern of the two has in several places the sand of which it is formed cemented into coral-sand rock, which shews plainly on the eastern side, and there is still in process of formation. On the western side this rock has been broken up by the south-westerly gales, and is strewn over the beach just above high-water mark; the northern and southern extremes are formed by sand spits which appear to be extending. The south island I had no opportunity of examining, but the plan of it shews that it has two arms or spits of sand extending from the extremes to the northward, in the direction taken by the ebb current. No good water exists on either island. In addition to the islands, a sandy spit and patches of sand, which dry, extend for more than a mile along the N.-E. side of the atoll.

A shallow flat with 4 to 5 fathoms on it extends off the north end for about a mile, otherwise the hundred-fathom line lies about 2 cables from the reef. From the existence of the reef flat the atoll appears to be extending most rapidly to the south and south-east sides. The islands are apparently formed first as sand cays.

Peculiar characteristics to be noted from the foregoing observations.

1. Kiltan, Chitlac, Kardamat, Kavaratti and Agatti are all situated on the eastern side of the atolls; at Betra Par there is an islet and two

sand-cays, at Peremul Par a sand cay and patches of sand, at the northern atoll Agatti, some small islets, and at Suheli Par two islets and some sand-cays; these again are all formed on the eastern side of the reefs, with the exception of the island of Bungarra in the north atoll of the Agatti group.

2. At Kiltán, Chitlac, Kardamat, Kavaratti and Agatti, the shallow depths where live coral exists, and the flourishing condition of the edges of the coral reefs on the western and southern sides, also the extensive shelf of reef-flat inside the outer reefs at Betra Par, Peremul Par, and the northern atoll Agatti, shew that the atolls are all extending westward, southward, and in the case of Suheli Par south and south-eastward more rapidly than in other directions.

3. The islands and islets are extending at their extremities, and in some cases are being added to on the lagoon side.

4. The larger the atoll the deeper the lagoon.

5. No signs of elevation or subsidence were observed. The islet at Betra Par, although being washed away on its N.-E. and S.-W. sides, is extending at its extremities.

6. Large boulders of coral rock are found on the beach, on the east and north east sides of the islands.

7. With one exception, that of Peremul Par, the entrances to the lagoon are on the north-east, north, and north west sides: that is, to windward.

A careful study of the strong winds found in the neighbourhood of the Laccadives establishes the fact that the strongest of the ordinary monsoon winds is from west, this sometimes has a force of 4 to 5; also the vast majority of winds are from some point between N. N.-E. round to S.-W. It is evident that these winds and the seas caused by them, could not have piled up large boulders and blocks of coral on the E. and N.-E. lee sides sufficient to form the foundations of the present islands; there must have been some other agency at work, and this is probably to be found in the hurricanes of these seas. Hurricanes are rare at the Laccadives, but between these islands and the coast of India and to the south-eastward over the southern end of the Indian Peninsula, hurricanes are comparatively frequent. Their course is to the W. N.-W. or north-westward, passing up between the Laccadives and the Malabar coast. (One of these storms is mentioned in the description of Chitlac). During these storms the winds at the Laccadives would be E., N.-E. (the N.-E. being very strong) N. and then N.-W. At the latter point the wind would be moderating.

The seas due to the hurricanes would strike on the eastern and

north-eastern sides of the atolls with tremendous force, smashing and tearing the coral boulders off the edge and hurling them on to the centre of the reef; here then would be the foundation for the future island. The currents and tides and ordinary monsoon winds would then be sufficient to complete the remainder of the building up process. The strong winds of the south-west monsoon would cause sufficient sea to grind portions of the reef to sand, and this would be carried by the currents over and around the atoll to the lee side; here eddy currents, due to the obstruction of the atoll, would occur, depositing sand and debris to assist in raising the reef above high water; seeds would be brought by the sea or deposited by the birds; then man assisting, the once barren reef would develop into the present thickly planted coconut island; each gale occurring would assist in adding to its size, and it may be that the parallel ridges noticed in some of the islands are due to the successive gales.

The cause of the more vigorous outward growth of the reef to the southward and westward, I have little doubt is due to the tides and currents. In these seas the currents vary with the monsoon, being nothing more than drift currents, except where their speed is accelerated by some obstruction, as off the south coast of Ceylon. In the Laccadives, the observations of currents are exceedingly scanty. Those observed during the Investigator's visits appeared to be entirely due to wind.

The Admiralty current-chart, compiled from the greatest number of observations obtainable, shews that the currents are from east and north-east during the north-east monsoon, and from north north-west to south-west during the remainder of the year, this latter period lasting from March until October, or for eight months. The east-going currents are strongest, would carry most food to the coral reefs, and striking first on the western side of the atolls, would give up a portion of the food which they carry; then the sand formed by the breakers would be carried from the weather side and be deposited to westward, tending to retard the coral growth on the eastern side and to assist in forming the present islands and islets.

The tides are not strong in the Laccadives; the flood sets to the north-east past the northern reefs and east and south-east in the neighbourhood of the southern ones, that is, in a course at right angles to the length of the reefs.

The flood would be a food-bearer to the reefs, and therefore the tides would be another agent assisting the outward growth of the reefs to the south-west and westward.

It is difficult to account for the positions of the openings to the la-

goons, which are as already stated on the north-east, north or north-west sides of the lagoon.

According to Dana* the waves with the rising tide dashing over the windward side of the reef, tends to keep open a leeward channel for the passage of the water. This is evidently not the case in the Laccadives, as the channels are generally on the weather side, but the position varies considerably without any apparent reason.

On a new species of Flying Lizard from Assam.—By A. ALCOCK, M.B.,
C.M.Z.S., Superintendent of the Indian Museum.

With Plate III.

[Received 15th October—Read 7th November.]

Draco norvillii, n. sp.

Nostril nearly vertical. Tympanum scaly and hidden. The wing-membranes with three broad scarlet bands : the lateral gular folds scarlet beneath.

Head one-fourteenth to one-fifteenth of the total length. Snout hardly longer than the diameter of the orbit.

Nostrils tubular : pierced at an angle of about 17° from the vertical.

Tympanum scaly and hidden. A scaly knob at the posterior angle of the orbit. Upper head-scales unequal, keeled : nine upper labials.

Gular appendage of the male a little longer than the head, broadly foliaceous, and covered with large thin scales : much resembling that of *D. blanfordii*. Nuchal fold just distinguishable. Dorsal scales small, smooth, unequal ; not, or not much, larger than the keeled ventrals. In the lateral series of enlarged scales there are not more than ten on either side, and these are very irregularly disposed, and have, most of them, tag-like keels. The forelimb stretched forward reaches beyond the tip of the snout by almost the length of the hand. The adpressed hind-limb reaches to the axilla.

Colours in spirit on the dorsal aspect : lichenous-mottled ; with shades of dull metallic blue predominating on the crown of the head and on the posterior thoracic region ; and with shades of dull purplish brown, with well defined black spots, on nape, neck, shoulders, and anterior thoracic region : wing-membranes beautifully reticulated mottled and speckled at base, and traversed by three dull red cross-bands, which are darkest near the edge. Of these cross-bands the most anterior extends

* *Corals and Coral islands*, James Dana, page 211.

from the edge to about the middle of the wing, where it is lost in an indistinct bifurcation : the most posterior extends from the angle of the wing, along its posterior border, right up to the groin, first bifurcating : while the middle one, which also ends in a bifurcation, is in extent, intermediate between the other two.

Median gular fold light lemon-yellow ; lateral gular folds dull scarlet beneath.

The dull red bands on the wing membranes, and on the under-surface of the gular side-folds are described as scarlet in life.

Total length	...	11·75 in.
Length of tail	...	7·5 „
Length of head	...	·8 „
Span of wings	...	4·1 „
Length of forelimb	...	2·0 „
Length of hindlimb	...	2·35 „

In accord with Mr. Boulenger’s Synopsis of the Genus *Draco* (Catalogue of the Lizards in the British Museum, second edition, 1885, pp. 253–255), this fine species would be placed with *D. quinquefasciatus* in the second section of the genus as follows:—

- Section 1. Nostril lateral, directed outwards : 17 species.
- Section 2. Nostril pierced vertically, directed upwards:—

A. Tympanum naked (*D. hæmatopogon*, *D. melanopogon*, *D. blanfordii*, *D. dussumieri*, *D. tæniopterus*, *D. obscurus*).

B. Tympanum scaly (*D. quinquefasciatus*, *D. norvillii*).

Its place among the *Indian* species of the genus is shown in the following table, modified from Mr. Boulenger’s Synopsis in the *Fauna of British India, Reptilia and Amphibia*, p. 112:—

- A. Nostrils lateral : tympanum scaly.....*D. maculatus*.
- B. Nostrils vertical:—

1. Tympanum naked*D. blanfordii*,
D. dussumieri, *D. tæniopterus*.

2. Tympanum scaly and hidden *D. norvillii*.

A single specimen was taken by Dr. F. H. Norvill of Doom Dooma, Upper Assam, to whom I have much pleasure in dedicating the species.



Materials for a Flora of the Malayan Peninsula.—By GEORGE KING, M.B., LL.D., F.R.S., C.I.E., *Superintendent of the Royal Botanic Garden, Calcutta*.

No. 7.

In working out the difficult family of *Meliaceæ*, I have had the great advantage of being able to consult a suite of the specimens of Blume and Miquel, which were kindly lent to me, for the purposes of comparison and study, by Drs. Suringar and Boerlage, of the Leiden Herbarium. Many specimens, chiefly of Bornean species, were, through the kindness of its Director, Mr. W. T. Thiselton Dyer, F.R.S., also lent to me from the Kew Herbarium, some of which were enriched by notes by Dr. O. Stapf, a member of the staff of that Institution.

ORDER XXVII. *Meliaceæ*.

Trees or shrubs. *Leaves* alternate, exstipulate, usually pinnate, rarely simple or bipinnate; leaflets opposite or alternate, usually quite entire and more or less oblique at the base. *Flowers* hermaphrodite or polygamo-diœcious, regular, usually in axillary panicles. *Calyx* 3-6-lobed, sometimes entire or with free sepals, usually imbricated in bud. *Petals* 3-6, free or rarely connate at the base, sometimes adhering to the lower half of the staminal tube, valvate or imbricated. *Stamens* 3-12, inserted outside the base of the hypogynous disk; filaments connate in a tube or rarely free; anthers erect, usually sessile on the tube, included or exserted, 2-celled, dehiscing longitudinally. *Hypogynous disk* tubular annular or obsolete, free or connate with the ovary. *Ovary* usually free, 2-5-celled; style single, stigma disciform or capitate; ovules 2, rarely more, collateral or superposed, raphe ventral, micropyle superior. *Fruit* capsular, drupaceous or baccate. *Seeds* exalbuminous or sometimes with fleshy albumen, often enclosed in an aril.—DISTRIB. About 700 species, mostly tropical.

KEY TO THE GENERA.

Stamens united in a tube.

*Cells of ovary with 1 or 2 ovules in each.

Leaflets serrate; fruit drupaceous ... 1. MELIA.

Leaflets entire; fruit baccate or capsular.

Flowers and staminal tube narrow, elongate; style elongate.

Stigmas 5 or 5-toothed; leaves trifoliolate; fruit

baccate ... 2. SANDORICUM.

Stigmas entire, single; leaves pinnate; fruit capsular
or sub-capsular.

Petals in 2 rows; ovary 7- to 9-celled, with 1 ovule

in each cell; disk short, inferior to ovary 3. MEGAPHYLLÆA.

Petals in a single row; ovary 2-to 4-celled.

Disk short, annular; ovules solitary in the cells

of the ovary ... 4. CHISOCHETON.

Disk cylindric, longer than the ovary; ovules 2

in each cell of the ovary ... 5. DYSOXYLUM.

Flowers and staminal tube globose or turbinate, style
short or absent.

Anthers included or incurved.

Petals 3; fruit dehiscent or not ... 6. AMOORA.

Petals 5; fruit indehiscent.

Style none ... 7. AGLAIA.

Style short, thick ... 8. LANSIUM.

Anthers exserted, never incurved, only partially united
into a tube (in two species of *Walsura* not united.)

Petals 5; fruit baccate, indehiscent ... 9. WALSURA.

Petals 4 or 5; fruit capsular, dehiscent 10. HEYNEA.

**Cells of ovary 2- to 8-ovuled; stigma discoid; fruit capsular;

seeds large, fleshy, not winged ... 11. CARAPA.

***Cells of ovary with numerous ovules in each; stigma

capitate; fruit capsular; seeds thin, winged 12. CHICKRASSIA.

Stamens distinct.

Cells of ovary 8- to 12-ovuled; seeds membranous, winged

13. CEDRELA.

Cells of ovary with 1 or 2 ovules, fruit baccate; seeds not

winged ... 9. WALSURA.

1. MELIA, Linn.

Trees with pinnate or 2- 3-pinnate leaves, toothed or entire leaflets and paniced axillary flowers; pubescence often stellate-mealy. *Calyx* short, 5-6 lobed, imbricated. *Petals* 5-6, free, spathulate-oblong, patent,

imbricated in bud. *Staminal-tube* cylindrical, dilated at base and apex, 10- or 12-striate and -toothed; anthers 10 or 12, included or partly exserted, short, inserted near apex. *Disk* annular. *Ovary* 3-6-celled; cells alternate to the sepals when equal in number to them. *Style* slender, nearly as long as the tube, stigma capitate; ovules 2, superposed. *Fruit* drupaceous. *Seeds* with thin fleshy albumen; cotyledons foliaceous. *Distrib.* About 12 species; Indo-Malayan.

Petals concave, obtuse; ripe drupe 1 to 1·5

in. long 1. *M. composita*.

Petals flat, sub-acute; ripe drupe ·6 to ·7 in.

long 2. *M. Azedarach*.

1. *MELIA COMPOSITA*, Willd. Sp. Plant. II. 558. A tall tree; young branches rather stout, at first covered with pale loose stellate pubescence, ultimately smooth and of a dark colour. *Leaves* 1 to 2 feet long, bi- or occasionally tri-pinnate, the leaflets on each pinna 5- to 11, petiolulate, from ovate-lanceolate to ovate-rotund, often oblique at the base, acuminate, serrulate or entire; the main nerves 7 or 8 pairs, sub-horizontal, rather distinct on the lower surface; both surfaces sparsely stellate-pubescent when young, ultimately glabrous. *Panicles* shorter than the leaves, pedunculate, spreading, stellate-hairy, many-flowered. *Flowers* ·3 to ·35 in. long. *Calyx* lobes erect, ovate-lanceolate, stellate-tomentose outside, pubescent or glabrous inside, much shorter than the petals. *Petals* linear-spathulate, concave, pubescent externally, puberulous internally. *Staminal tube* nearly as long as the petals, slightly expanded at the 10-toothed mouth; the teeth bifid, silky-puberulous on both surfaces; anthers exserted, pubescent. *Stigma* 5-toothed. *Drupe* ovoid, 1 to 1·5 in. long, smooth, yellowish. *Seeds* one in each cell, smooth, pointed. W. and A. Prod. I. 117. (excl. syn. *M. superba*, Roxb.); Dalz. and Gibs. Fl. Bomb. 36; Thwaites Enum. Pl. Ceyl. 59; Bedd. Fl. Sylvat. t. 12; Brandis For. Flora 69. *M. dubia*, Hiern (not of Cav.) in Hook. fil. Fl. Br. Ind. I, 545; De Cand. Monog. Phan. I. 453; Trimen Flora Ceylon Vol. 1. 243 (exc. from all the syn. *M. superba*, Roxb.). *M. robusta*, Roxb. Hort. Beng. 33; Fl. Ind. II, 397. *M. australasica*, Adr. Juss. in Mem. Mus. XIX, 257. *M. æthiopica* and *M. Bombolo*, Welw. Apontam. Phyto-Geogr. Prov. Angola, 584 and 561. *M. argentea*, Herb. Ham. ex Wall. Cat. 1254 C.

Malacca: Maingay No. 317 (Kew Dist.), and probably in some of the other provinces. *DISTRIB.* Brit. India, Ceylon, Australia, Angola.

This is a widely-spread species, and has received many names. From the synonymy above quoted, I have excluded *M. superba* Roxb., which I believe to be a distinct species, with which the tree named *M. Birmanica* by Kurz (Journ. As. Soc. Bengal, Vol. 43, pt. 2, p. 183;

For. Flora Burm. I, 213) is probably identical. In Roxburgh's original descriptions of *M. superba* and *M. robusta*, he carefully states the differences on which he depends for their separation. These are as follow:—

<i>M. superba.</i>	<i>M. robusta.</i>
<i>Leaves</i> bi- tri-pinnate, 2 to 4 feet long.	<i>Leaves</i> bi-pinnate, 12 to 18 in. long.
<i>Flowers</i> small, dull white, with an offensive smell.	<i>Flowers</i> small, white, inodorous.
<i>Bracts</i> small, lanceolate, caducous.	<i>Bracts</i> solitary, filiform and often very long.
<i>Sepals</i> ovate-lanceolate, incurved, mealy.	<i>Sepals</i> ovate-oblong.
<i>Staminal tube</i> 10-ribbed, hairy inside, each of the ten teeth of the mouth divided into 3 4 or 5 short subulate segments.	<i>Staminal tube</i> with the segments of its mouth minute and filiform.

Specimens of both trees were growing in the Calcutta Garden when Roxburgh described them, the one having been received from Sunda, the other from Malabar. Roxburgh, of whose sagacity and judgment one has a thousand examples, considered them as quite distinct, and it would take a great deal more evidence than has been produced to make me believe that they are conspecific. The Malabar plant (*M. robusta*) is clearly the same as the Ceylon species which has since been identified with *M. composita*, Willd., Sp. Plantar. II 559. I cannot however agree to the view, first put forward by Mr. Hiern, that *M. composita* Willd. should be reduced to *M. dubia*, Cav. Cavanilles describes three species of *Melia*, viz., *M. azedarach*, *azedirachta*, and *dubia*, and he gives figures of the first two, but not of *M. dubia*. He describes flowers of the latter as like those of *M. Azadirachta* in size, the staminal tube as 6-toothed with a possibility of more teeth ("an pluribus?"), and the stigma as peltate. Now, as a matter of fact, the flowers of *M. composita* Willd. are in size and other respects like those of *M. Azidarach*, and not like those of *M. Azadirachta*. The mouth of the staminal tube is many-toothed, and the stigma is ovoid, 5-toothed, and not peltate. Cavanilles' description points to a plant belonging to some other genus than *Melia*, whatever the "original specimen" named *M. dubia* in the Herbarium of the University of Rostock may be; and it is on that specimen which the reduction of *M. composita* to *M. dubia* is based. (See Hiern in Hook. fil. Fl. Br. Ind. I, 545.) No authentic specimen of *M. superba* is, so far as I know, in existence (the specimens issued by Wallich, under this name, being really *M. robusta*, Roxb.). In my opinion *M. superba* Roxb., (the Sunda i.e., Malayan) species, cannot on account of its staminal tube (densely villous internally and with numerous minute teeth at the mouth) be in-

cluded, like *M. robusta*, Roxb., under *M. composita*, Willd. For the teeth of the mouth of the staminal tube of the latter are at most bifid, while its inner surface is nearly glabrous. The only specimens of *Melia* known to me which fits Roxburgh's description in these and other respects, were collected in Burma by the late S. Kurz, and were described by him under the name *M. birmanica*, (Journ. As. Soc. Bengal, 1874, ii. 183; For. Flora Burmah, I, 213). And I know of no other specimens of *M. birmanica* than those of Kurz's collecting. Certainly Maingay's No. 317 (Kew Distrib.) is not the same, as I have determined by dissecting flowers of both. *M. composita*, Willd., is not really very distinct from the Japanese *M. Toosedan*, Sieb. and Zucc., which, in turn, is closely allied to *M. Azadirach*. There are, by the way, in the Calcutta Herbarium, specimens from the Khasia Hills, Munipore, the plains of Assam and also from Sumatra, which, as far as I see, cannot be distinguished from Japanese specimens of *M. Toosedan*. If this identification be correct, the geographical area of the latter species will have to be largely extended.

M. Azadirachta, Linn., is not found in the Malayan Provinces even planted. But *M. Azadarach*, Linn., is very common planted. It presents several varieties, some of which have been elevated to the rank of species.

Roxburgh describes a Penang plant which he names *Melia tomentosa*. Of this no specimen is known now to exist. But he left an excellent coloured drawing of it in the Calcutta Herbarium, which shows it to be no *Melia* but a *Chisocheton*. Jack describes (Malayan Miscellanies I, 12) a Penang species which he named *Melia excelsa*. The only specimens known of this are what Wallich issued (under this name) as No. 1253 b. of his catalogue. The only Wallichian specimens of this which I have seen are without flowers: they have simple long pinnate leaves, and their *facies* is not that of *Melia* but of some other genus.

2. MELIA AZIDARACH, Linn. Sp. Pl. ed. I., 384. A small tree; young branches rather slender, at first scurfy-puberulous, afterwards dark-coloured and glabrous. *Leaves* 1·5 to 2 feet long, bi-pinnate, glabrous when adult; pinnæ about 3 pairs, the uppermost often 3-foliolate; pinnulæ 5 to 7, opposite or sub-opposite, obliquely ovate or oblong-ovate, acuminate, shortly petiolulate, 1·5 to 2 in. long, when young coarsely serrate, when adult serrulate or sub-entire. *Panicles* shorter than the leaves, shortly pedunculate, spreading, lax, few-flowered, at first stellate-puberulous but ultimately glabrous. *Flowers* ·35 in. long. *Calyx-lobes* oblong-lanceolate, pubescent. *Petals* flat, oblanceolate-spathulate, puberulous. *Staminal tube* lilac, expanding at the 30-toothed mouth, glabrous

outside, sparingly pubescent inside. *Style* clavate at the apex; *stigma* 10-lobed. *Drupe* oblong, smooth yellowish, .6 or .7 in. long. Linn. Hort. Cliff. 161; Cav. Diss. 7 t. 393, p. 207; Roxb. Hort. Beng. 33; Fl. Ind. ii. 395; Wight Ic. t. 160; Wall. Cat. 1250; DC. Prod. i, 621, Boiss. Fl. Orient. i. 954; W. & A. Prodr. i. 117; Adr. Juss. in Mém. Mus. xix. t. 13, f. 4; Bot. Mag. t. 1066; Bedd. Fl. Sylvat. t. 13; Brandis For. Flor. 68; Miq. Fl. Ind. Bat. I, Pt. 2, p. 533; Ann. Mus. Lugd. Bat. V. 5; Kurz For. Flora Burmah. I, 212; Hiern in Hook. fil. Fl. Br. Ind. I, 544; C. DC. Monog. Phan. I, 451. *M. sempervirens*, Sw. Prodr. 67; Bot. Reg. t. 643; Roxb. Hort. Beng. 33; Fl. Ind. ii. 395; Wall. Cat. 1252; Dalz. & Gibs. Bomb. Fl. Suppl. 15. *M. Bukayun*, Royle Ill. Bot. 144; Griff. Itin. Notes 355, 403.

Planted in most of the Provinces, and in all the warmer parts of both the Old and New Worlds.

2. SANODRICUM, Cav.

Trees with trifoliate, coriaceous, entire leaflets, the lateral with a short, the terminal with a long petiolule. *Flowers* pentamerous with imbricate æstivation, in axillary panicles. *Calyx* cup-shaped, its tube adnate to the base of the ovary, its lobes short. *Petals* free, oblong, obtuse. *Staminal tube* cylindric, nearly as long as the petals, the mouth 10-toothed. *Anthers* 10 or 8, included. *Disk* tubular, embracing the ovary and base of the style. *Ovary* immersed in the calyx-tube, narrowed upwards into the columnar style, 5-celled, each cell with 2 collateral pendulous ovules. *Style* clavate at the apex. *Stigmas* 5, erect, sub-cylindric, fleshy, each surrounded at the base by a fleshy ring. *Berry* superior, sub-globular, fleshy, indehiscent, 3·5-celled, and with as many arillate seeds; the aril papery outside, pulpy inside. **DISTRIB:** About seven species—all Indo-Malayan.

Stigmas united, radiating, their apices re-curved

... 1. *S. radiatum*.

Stigmas distinct, erect, sub-cylindric.

Staminal tube cylindric, ventricose in

the upper half ... 2. *S. Maingayi*.

Staminal tube cylindric, not ventricose.

Leaflets emarginate ... 3. *S. emarginatum*.

Leaflets more or less acuminate ... 4. *S. indicum*.

1. **SANDORICUM RADIATUM**, King, n. sp. A tree 40 to 80 feet high. *Leaves* 6 to 12 in. long; leaflets sub-coriaceous, broadly ovate, sub-oblique, acute or shortly acuminate, the base slightly cuneate; upper surface glabrescent or glabrous, the lower pubescent on the midrib and 8 to 10 pairs of spreading sub-prominent nerves; length 3 to 6 in.,

breadth 1.75 to 4 in.; petiolules .2 to .5 in., the terminal one 1.5 to 2.5 in. *Panicles* with few short branches, slender, 3 to 5 in. long, few-flowered, lax. *Flowers* .25 in. long; the pedicels about as long, slender, puberulous. *Calyx* cupular, less than half as long as the petals, with 5 shallow broad sub-acute teeth, puberulous. *Petals* narrowly elliptic, longer than the staminal tube. *Staminal tube* cylindric, not ventricose, ridged, glabrous, its mouth with ten subulately bifid teeth: anthers ovate with broad bases, included. *Ovary* cylindric, tapering into the short style; stigmas radiating, their apices recurved. *Fruit* unknown.

Perak: Wray No. 3345; King's Collector No. 6001. Singapore: Ridley No. 4822.

This differs from the other three species in its stigmas which unite to form a radiate discoid mass, the edges being recurved; while the other three species have erect slender un-united stigmas.

2. *SANDORICUM MAINGAYI*, Hiern in Hook. fl. Fl. Br. Ind. I, 554. A tree. *Leaves* 6 to 8 in. long: leaflets elliptic, sub-glabrous, sub-acuminate, the base obtuse or sub-acute; main nerves 6 to 8 pairs, depressed on the upper, prominent on the lower surface, spreading; length 2 to 5 in., breadth 1.5 to 3 in.; petiolules .35 in., the terminal one 1.25 to 1.75 in. *Panicles* shorter than the leaves, lax, puberulous. *Flowers* .35 to .45 in. long, their pedicels of about the same length; bracteoles minute, subulate. *Calyx* fleshy, obscurely toothed, minutely pilose. *Petals* three times as long as the calyx, fleshy, elliptic, blunt, glabrous. *Staminal-tube* cylindrical, ventricose in the upper half, ridged; the mouth with 10 bifid teeth. *Stigmas* erect, rather long. *Fruit* unknown. C. DeCand. Mem. Phan. I, 462.

Malacca; Maingay (Kew Distrib. No. 328).

I have seen only Maingay's Malacca specimens. They resemble *S. borneense*, Miq., of which I have seen the type specimen; but that species has narrower and longer leaflets with more numerous lateral nerves; it has also smaller flowers.

Mr. Hiern describes this as a tree, M. C. DeCandolle as a shrub.

3. *SANDORICUM EMARGINATUM*, Hiern in Hook. fl. Fl. Br. Ind. I, 553. A tree. *Leaves* 5 to 7 in. long; leaflets obovate to elliptic, the apex emarginate and usually mucronate, slightly narrowed to the oblique base; main nerves 5 to 6 pairs, spreading, slightly prominent; length 2 to 3.5 in., breadth 1.25 to 2 in., petiolules .35 to .5 in., the terminal one 1 to 1.25 in. *Panicles* short, dense; flowers .2 in. long, shortly pedicellate. *Calyx* cup-shaped, slightly accrescent. *Staminal-tube* with 8 or 10 sub-glabrous emarginate teeth. *Fruit* (immature) sub-globular or obovoid, densely and minutely tomentose. C. DeCand. Mem. Phan. I, 461. *S. Beccarianum*, Baill. in Adansonia, 264.

Malacca: Maingay (Kew Distrib. No. 331).

I have seen only Maingay's imperfect specimens of this. The above description is copied chiefly from Hiern.

4. *SANDORICUM INDICUM*, Cav. Diss. VII, p. 359, tt., 202, 203. A tree 30 to 40 feet high. *Leaves* 9 to 18 in. long; leaflets broadly ovate to ovate-rotund, shortly and abruptly acuminate, the base rounded or sub-cuneate, slightly unequal; main nerves 8 to 12 pairs, spreading, impressed on the upper, prominent on the lower surface when dry; upper surface glabrous, lower pubescent or puberulous, becoming glabrescent when old; length 4 to 8 in., breadth 2 to 4.75 in.; lateral petiolules 3 to 4 in., terminal 2 to 3 in. *Panicles* several, scattered near the apices of the branches, only a few inches long, few-flowered, minutely rusty-tomentose. *Flowers* .4 or .5 in. long; pedicels .25 in., pubescent. *Calyx* minutely tomentose. *Petals* linear-elliptic, obtuse, fleshy, glabrous. *Staminal tube* narrow, fleshy, striate, glabrescent outside and puberulous inside. *Fruit* sub-globose, obtusely 5-angled at least when young, densely but minutely pubescent, 1.5 to 2 in. in diam., filled with a yellowish acid edible pulp; arillus with many spongy woody fibres; seed brown, glossy. W. & A. Prodr. i. 120; Blume Bijdr. I. 163; Adr. Jus. in Mem. Mus. xix. t. 16, f. 15; Hassk. Retzia, i. 146; Roxb. Cor. Pl. iii. 58, t. 261; Fl. Ind. ii. 392; Wall. Cat. 1249; Kurz For. Fl. Burma, I, 217; Heirn in Hook. fil. Fl. Br. Ind. I, 553; De Cand. Mon. Phan. I, 461; Miq. Fl. Ind. Bot. I Pt. 2., p. 541. *Sandoricum nervosum*, Blume Bijdr. I., 165; Miq. in Ann. Mus. Lugd. Bat. IV, 30. *S. ternatum*, Blanco Fl. Filip. ed. i. 346. *S. glaberrimum*, Hassk. Retzia, i. 145. *Trichilia nervosa*, Vahl Symb. i. 31. *Melia Koetjape*, Burm. Fl. Ind. 101. *T. venosa*, Spreng. Syst. iii. 68.

In all the Provinces except the Nicobar Islands. **DISTRIB.** Siam; the Malayan Archipelago, Burma.

The fruit of this is edible, and on that account the species is occasionally cultivated.

3. *MEGAPHYLLÆA*, Hemsl.

A tree. *Leaves* large, pinnate; leaflets opposite, slightly oblique. *Panicles* extra-axillary, narrow and raceme-like, shorter than the leaves. *Flowers* more than 1 in. across when expanded. *Calyx* cupular, fleshy, sub-persistent, annulate and thickened below the middle; its tube adnate to the base of the ovary, its mouth irregularly 3 to 5-lobed. *Petals* 10, narrowly elliptic, thickly coriaceous, in two rows, free, imbricate. *Staminal-tube* cylindric, its mouth obscurely crenulate; anthers 10, included. *Disk* cushion-shaped, many-lobed. *Ovary* seated on the disk, depressed, 7- to 9-celled; style thick, stigma capitate, ovules one from the central angle of each cell. *Capsule* large, sub-spherical, 7- to

9-lobed, 7- to 9-celled, the pericarp very thick. *Seeds* exalbuminous, compressed, exarillate, glabrous, with large hilum and conferruminate cotyledons.

DISTRIB. A single Malayan species.

MEGAPHYLLÆA PERAKENSIS, Hemsl. in Hook. Ic. Plant. t. 1708. A tree 20 to 40 feet high. *Leaves* when adult 6 or 7 feet long (*fide* Hemsl.), glabrous, the petiole and rachis compressed; leaflets oblong, subcoriaceous, sub-acute; the base oblique, sub-truncate or cuneate; the larger 12 to 15 in. long, 3 to 4 in. broad; petiolules .35 to .75 in.; main nerves 10 to 12 pairs, spreading, curving, slightly prominent beneath. *Panicles* 16 to 20 in. long; the lateral branches short, racemose, few-flowered; the main rachis 4-angled, compressed. *Flower-buds* clavate, narrowed into a pseudo-stalk as long as the pedicel proper. *Flowers* 1 in. long, and about 1.25 in. in diam. when expanded, their pedicels .35 in. long. *Calyx* shortly cylindric, with a thick lobulated ring outside near the thickened base, puberulous outside. *Staminal-tube* shorter than the petals, pubescent inside below the insertion of the anthers, otherwise glabrous. *Anthers* elliptic. *Ovary* and lower half of style minutely tomentose. *Fruit* globular-pyriform, densely but minutely tomentose, about 3 in. in diam.; the pericarp 1 in. thick. *Seeds* 1 in. long.

Perak; at elevations of 3,000 to 4,000 feet, Scortechini, Wray, Curtis, King's Collector.

This genus was placed by its author provisionally next to *Chisoche-ton* to which it is no doubt closely allied, the points in which it chiefly differs from that genus being its two-ranked petals and 7- to 9-celled ovary. I give the length of the leaves as 6 to 7 feet on the authority of Mr. Hemsl. who, in his figure, shows the leaflets as very numerous. None of the Herbarium specimens which I have seen enable me to estimate either the length of the former or the number of the latter.

4. CHISOCHETON, Blume. (*Schizochiton*.)

Trees or shrubs. *Leaves* equally pinnate; leaflets entire, opposite or sub-opposite, more or less oblique. Flowers polygamo-dicæcious, in extra-axillary, rarely axillary, divaricately-branched panicles and numerous; or in spike-like racemes or cymes and few. *Calyx* small, cup-shaped or cylindric, entire or 4-5-toothed. *Petals* 4-5 or more, usually linear-elongate or cylindric, at first cohering in a tube especially below, at length spreading, somewhat imbricated or valvate. *Staminal tube* elongate, slender, tubular, 4 to 12-lobed at the apex, lobes entire or toothed; anthers linear, equal in number to and alternate with the lobes, included or somewhat exserted. *Disk* short and fleshy,

or tubular. Ovary short, 2- 4-celled; style filiform, usually exceeding the staminal tube; stigma capitate or cylindric, usually with a ring at its base; ovules usually one in each cell. Capsule sub-globose, often beaked, thickly coriaceous, 2- 4-celled. Seeds often enclosed in an imperfect aril; cotyledons usually peltate.—DISTRIB. An Indo-Malayan genus of about 22 species.

Inflorescence only a few inches long, much shorter than the leaves, spike-like, few-flowered; fruit beaked.

Flowers .5 in. long, narrowly cylindrical
in bud 1. *C. spicatus.*

Flowers .9 in. long, widely cylindrical in
bud 2. *C. pauciflorus.*

Inflorescence extra-axillary, spike-like, a foot long or upwards, including the peduncle.

Flowers confined to the terminal two
inches of the inflorescence, the pedun-
cles very much longer; flowers .5 or .6
in. long, 4-merous, cylindric in bud;
fruit beaked 3. *C. Kunstleri.*

Flowers on short lateral branches scattered
along the rachis of the inflorescence.

Flowers .75 to .1 in. long, 4- or 5-
merous, clavate in bud; fruit beaked 4. *C. penduliflorus.*

Flowers 1.25 to 1.5 in. long, cylin-
dric in bud; petals 7 to 9; fruit
not beaked 5. *C. rubiginosus.*

Flowers on distant lateral glomeruli 1.25
to 1.5 in. long; petals 5; fruit sub-
globular, not beaked 6. *C. princeps.*

Inflorescence extra-axillary, paniculate.

Young shoots, under surfaces of leaves,
petioles, and inflorescence pubescent or
tomentose.

Panicles as long as the leaves; flowers
.25 in. long; petals 4, anthers much
exserted from staminal tube ... 7. *C. glomeratus.*

Panicles about half as long as the
leaves; flowers .45 in. long; anthers
included in staminal tube ... 8. *C. erythrocarpus.*

Rachises of leaves and both surfaces of
leaflets minutely pubescent; panicles

puberulous; flowers .5 to .6 in. long,
 their buds very clavate; calyx with an
 annulus below its teeth ... 9. *C. annulatus*.

Rachises of leaves sub-glabrous; midrib
 and nerves of leaflets minutely pubescent
 on the lower surface when young; flow-
 ers .5 to .6 in. long, cylindric in bud;
 calyx not annulate ... 10. *C. macrophyllus*.

Leaves everywhere glabrous.

Petals 5; leaflets 2 to 4 pairs;
 panicles longer than the leaves, much
 branched; flowers .5 in. long; sta-
 minal tube truncate with about 14
 broad shallow teeth ... 11. *C. macrothyrsus*.

Petals 4.

Mouth of staminal tube almost
 entire, slightly waved; flowers
 .4 or .5 in. long ... 12. *C. laxiflorus*.

Mouth of staminal tube with 6
 long lanceolate teeth.

Flowers greenish-white, fœ-
 tid; fruit pyriform, gla-
 brous, deep red in colour... 13. *C. patens*.

Flowers yellow, fragrant;
 fruit turbinate-globular,
 yellow when ripe ... 14. *C. divergens*.

1. *CHISOCHETON SPICATUS*, Hiern in Hook. fil. Fl. Br. Ind. I, 550. A
 tree about 30 feet high; young shoots and inflorescence deciduously
 tawny-tomentose. *Leaves* 8 to 12 in. long, equally pinnate; leaflets
 2 or 3 pairs, opposite, membranous, oblong-lanceolate to elliptic or
 ovate, shortly and bluntly acuminate, the base cuneate, slightly obli-
 que; upper surface quite glabrous, the lower with the nerves and
 midrib puberulous; main nerves 4 to 6 pairs, curving; length 2.5 to 5
 in., breadth 1.35 to 2 in., petiolules .25 to .35 in. *Panicles* spike-like,
 axillary, 2 to 3 in. long, angled, adpressed-pubescent, few-flowered.
Flowers .5 in. long, their pedicels about .1 in., pubescent. *Calyx* deeply
 cup-shaped, tomentose, the mouth truncate sub-entire or irregularly
 toothed. *Petals* 5 (sometimes 4?) much larger than the calyx, narrowly
 elliptic, united by their edges, and densely and minutely adpressed rusty-
 tomentose outside, glabrous inside. *Staminal tube* nearly as long as
 the petals, narrowly cylindric, densely adpressed-pubescent outside,
 the mouth with 5 broad teeth. *Stamens* 5, elongate, narrow, inserted

below the mouth, included. *Ovary* narrowly elliptic; the style long, cylindric; stigma capitate with a large central mamilla. *Fruit* transversely oblong, tapering to each end, the upper end compressed, acute, the lower terete, minutely rusty-tomentose; seeds two, sub-compressed, .5 in. in diam., length (including the tapering ends) nearly 2 in., breadth .75 in. C. DeCand. Mon. Phan. I, 535.

Malacca: Maingay (Kew Distrib.) No 363. Perak: Scortechini.
DISTRIB: Sumatra, Borneo.

The fruit of this is very peculiar, being in shape something like a spear-head. The central part, in which the two seeds are contained, is transversely-oblong and thick; above this is a long compressed conical prolongation filled with a little pulp, while at the base the fruit is gradually narrowed into a stalk. The sparsely-flowered spike-like inflorescence is also peculiar in the genus.

2. *CHISOCHETON PAUCIFLORUS*, King, n. sp. A shrub or small tree; young shoots slender, puberulous, the bark dark when dry. *Leaves* 5 to 15 in. long, equally pinnate; leaflets thinly coriaceous, 2 rarely 3 pairs, oblanceolate or oblong-lanceolate, sometimes ovate or elliptic, shortly and rather abruptly acuminate, the base cuneate; the upper surface glabrous, shining; the lower dull, glabrescent, reticulate, puberulous on the midrib and nerves; main nerves 5 or 6 pairs, ascending, curving, slightly prominent beneath; length 2.5 to 9 in., breadth 1 to 4 in., petiolules .1 to .2 in. *Panicles or racemes* from 1 to 3.5 in. long, extra-axillary, puberulous, 2- to 6-flowered. *Flowers* about .9 in., long; their pedicels .25 to .5 in., puberulous. *Calyx* fleshy, tubular, the mouth entire and truncate or with 4 or 5 shallow teeth, tomentose, about .25 in. long. *Petals* 4 or usually 6, free, about .8 in. long, fleshy, spathulate-elliptic or elliptic, blunt, minutely tomentose outside, glabrous inside. *Staminal tube* nearly as long as the petals, sub-glabrous, obscurely toothed at the mouth; the anthers from 4 to 8 or 10, varying with the number of petals, small, elliptic, included. Disc small, flat, tomentose. *Ovary* conical, tapering into the long cylindric style, sometimes narrowly cylindric (probably abortive). *Stigma* cylindric, obscurely 4-lobed at the apex. *Fruit* (unripe), elliptic, with a stout acute apical beak, tapered at the base, everywhere tomentose, the calyx persistent and slightly accrescent.

Perak: Scortechini; Wray, No. 2681; King's Collector, Nos. 3128, 3313, 3396, 3467 and 4455.

This species resembles *C. spicatus*, Hiern, in leaves; but has much larger flowers. Its fruit is as yet unknown. This also resembles *C. diversifolius*, Miq., in leaves, but has larger flowers.

3. *CHISOCHETON KUNSTLERI*, King, n. sp. A shrub 6 to 20 feet

high. *Leaves* 12 to 18 in. long, their petioles and rachises rusty-tomentose; leaflets 3 to 5 pairs, oblong-ob lanceolate or lanceolate, cuspidate, slightly narrowed to the cuneate base. Upper surface glabrous except the tomentose midrib; under surface rusty-tomentose, the 16 to 18 pairs of spreading curving main nerves prominent. *Spikes* supra-axillary, solitary, on very long peduncles, rusty-tomentose; peduncles 6 to 12 in., the flowering part about 2 in. *Flowers* .5 to .6 in. long, crowded, subsessile, minutely bracteolate. *Calyx* cylindric, about .1 in. long, densely tomentose, the mouth with 4 minute teeth. *Petals* 4, oblong, concave at the apex, yellowish, sericeous outside, glabrous inside. *Staminal tube* shorter than the petals and coherent with them below, glabrous, with a few scattered coarse hairs near the middle outside, the mouth with 4 broad emarginate or erose teeth; anthers 4, elliptic, included. *Ovary* ovoid, sericeous; style cylindric with a few scattered hairs, stigma cylindric with a thin annulus at its base. *Fruit* sub-globular, tomentose, with a long thick apical beak, .75 in. in diam., the beak .5 in. long.

Perak : King's Collector, Nos. 4502, 7783, Scortechini.

4. *CHISOCHETON PENDULIFLORUS*, Planch. ex Hook. fil. Fl. Br. Ind. I, 550. A shrub or small tree; young branches tawny-tomentose. *Leaves* 15 to 24 in. long, their rachises tawny-tomentose: leaflets 5 pairs, opposite, with occasionally a terminal odd one, elliptic to ovate, the upper occasionally sub-obovate, all shortly acuminate; rounded at the base, or narrowed from above the middle to the sub-acute minutely cordate sub-oblique base; main nerves 15 to 18 pairs, spreading, rather prominent beneath; upper surface glabrescent, the midrib and nerves pubescent; the lower reticulate, sparsely pubescent, the midrib tomentose: length 3 to 9 in., breadth 1.5 to 3 in., petiolules less than .1 in., tomentose. *Panicles* about as long as the leaves, supra-axillary, on long drooping tomentose slender peduncles; the lateral branches few, short, densely flowered. *Flowers* .75 to nearly 1 in. long, on very short pedicels, dull red, 4- or 5- merous, clavate in bud, the lower part very slender especially in the barren flowers. *Calyx* short, tubular, the mouth entire or 4- or 5- toothed, coarsely pubescent. *Petals* 5, linear-spathulate, concave and thickened towards the apex, longer than, and in their lower part coherent with, the staminal tube, pubescent in the middle and glabrous on the edges outside. *Staminal tube* narrow, with a few coarse adpressed hairs near the apex outside, the mouth rather deeply 3- to 6- toothed, the teeth emarginate or erose. *Anthers* 3 to 5, narrow, elongate, sessile, included or slightly exserted. *Ovary* sub-ovoid, short, sub-glabrous. *Style* long, slender, adpressed-pubescent below, glabrous above. *Stigma* discoid, thick, surrounded at the base

by an annular band. *Fruit* (unripe) ovate, tomentose, on a very short thick stalk, .75 in. diam.; the apex with a curved thick blunt beak. C. De Cand. Mon. Phan. I, 536. *Melia penduliflora*, Wall. Cat. No. 1255.

Penang; Porter, Curtis. Malacca: Maingay (Kew Distrib.) No. 325. Perak; Scortechini, Wray, King's Collector.

In this species the flowers are of two kinds. One set, which are longer than the other, are very conspicuously clavate, the lower part being filiform; in these the ovary is small and infertile and the stamens are included. The other set have shorter thicker less clavate flowers, fertile ovaries, and exserted stamens.

5. *CHISOCHETON RUBIGINOSUS*, King n. sp. A tree 20 to 30 feet high. *Leaves* 2 to 3 feet long, the petiole and rachises tawny-tomentose, sub-compressed. *Leaflets* 4 to 8 pairs, coriaceous, sub-opposite, elliptic to oblong, very shortly acuminate, slightly narrowed to the rounded minutely sub-cordate base: upper surface glabrous, except the tomentose midrib and main nerves, sub-reticulate; the lower reticulate, rusty-pubescent; main nerves 12 to 18 pairs, spreading, rather straight, prominent beneath; length 5 to 12 in., breadth 2.5 to 4 in., petiolules about .1 in. *Panicles* spike-like, supra-axillary, about half as long as the leaves, on long peduncles, the branches very short and crowded near the apex, bracteolate. *Flowers* rather crowded, 1.25 to 1.5 in. long, on very short pubescent pedicels. *Calyx* cylindric, cup-like; the mouth truncate, entire or with 8 or 10 shallow irregular teeth; tomentose outside, glabrous inside. *Petals* usually 7 sometimes 8 or 9, linear, sub-spathulate, slightly concave and thickened at the apex, 1 to 1.25 in. long, tomentose externally, glabrous internally. *Staminal tube* shorter than the petals and free from them, narrowly cylindric and glabrous below, slightly expanded and pubescent at the mouth; mouth with 10 to 15 linear erect teeth: anthers from 10 to 15, elongate, alternating with the teeth and of about the same length. *Ovary* ovoid, sericeous like the cylindric style; stigma cylindric. *Fruit* (unripe) ovoid, rugose, densely rusty-tomentose, 1.5 in. long.

Perak: Scortechini, Wray, King's Collector.

This species is allied to *C. princeps*, Hemsl., but has a different inflorescence and smaller leaves. I think it possible that this may be *Melia tomentosa* Roxb., a species from Penang, of which there is no specimen extant, but of which there is a drawing (reduced in size) in the Calcutta Herbarium. The only serious discrepancy is that Roxburgh describes and figures only five petals; whereas in all the Perak specimens which I have examined there are at least 7, and in many 8, or 9, and in one even 10 petals.

6. *CHISOCHETON PRINCEPS*, Hemsley in Hook. Ic. Plant. t. 1844.

An unbranched tree 40 feet high. *Leaves* 9 to 10 feet long; the rachises somewhat compressed, puberulous. *Leaflets* coriaceous, opposite, oblong, acute, the base rounded and slightly oblique: upper surface rugulose, shining, glabrous except the tomentose midrib and main nerves; lower surface reticulate-areolate tawny-pubescent; main nerves 15 to 30 pairs, spreading and little curved; length 9 to 18 in., breadth 2·5 to 4·5 in.; petiolule ·3 in., stout. *Panicles* spike-like, 3 feet or more in length; the branches distant, sub-sessile, glomeriform, each crowded with 20 to 30 elongate obovate shortly pedicellate flowers 1·25 to 1·5 in. long. *Calyx* ·2 in. long, about one-seventh of the length of the petals, cupular, entire or with 3 or 4 rudimentary teeth, truncate, puberulous. *Petals* 5, linear-spathulate, concave at the apex, adpressed-sericeous outside, glabrous inside. *Staminal-tube* slightly adherent to and shorter than the petals, cylindric, slightly wider at the minutely 10-toothed mouth; villous in the lower half inside, otherwise glabrous; anthers 10, short, linear, sub-included. *Ovary* small, cylindric, 5-grooved, surrounded by a small annular disc. *Style* cylindric, sparsely pubescent, slightly longer than the staminal-tube, cylindric. *Fruit* sub-globular, the apex depressed, the sides vertically grooved, rusty-tomentose, 2·5 in. in diam. *Seeds* 3 to 5, 1·75 in. long.

Penang: Curtis No. 1519.

A remarkable species with very long pendulous leaves.

7. *CHISOCHETON GLOMERATUS*, Hiern in Hook. fil. Fl. Bl. Ind. I, 551. A tree 40 to 70 feet high; young shoots deciduously tomentose, the bark dark when dry. *Leaves* 12 to 18 in., the petiole and rachises pubescent; leaflets 2 or 3, rarely 4 pairs, thinly coriaceous, opposite, elliptic to elliptic-oblong, very shortly acuminate, the base rounded, unequal-sided; main nerves 9 to 11 pairs, spreading, prominent beneath; upper surface minutely punctate when dry, glabrous except the pubescent nerves and tomentose midrib; lower surface softly pubescent, the midrib and nerves tomentose; length 4 to 6·5 in., breadth 1·8 to 2·5, petiolule ·1 to ·15 in. *Panicles* solitary, drooping, supra-axillary, as long as the leaves; the lateral branches rather numerous, horizontal, pedunculate, each bearing several dense many-flowered small cymes, everywhere tomentose. *Flowers* ·25 in. long, sub-sessile, minutely bracteolate. *Calyx* short, tubular, puberulous outside, sub-entire or irregularly toothed, much shorter than the corolla. *Petals* 4, erect, elliptic, slightly concave, glabrescent. *Staminal-tube* much shorter than the petals and coherent with them, rather wide, glabrescent, the mouth with 6 to 8 long linear teeth. *Anthers* linear, elongate, much exserted. *Ovary* ovoid, tapering into the cylindric style, and like it tomentose. *Stigma* cylindric, rather long, glabrous. *Fruit* (immature) sub-globular, on thick slightly curved pedicels,

not apiculate, but tapering at the base into a short pseudo-stalk, rusty-tomentose, 1 in. in diam., seeds two. C. De Cand. in Mon. Phan. I, 532. *Schizochiton*? Wall. Cat 9040.

Penang, Porter. Perak: King's Collector, Nos. 8462, 10227, 10624.

I am not satisfied that two closely allied species are not united under the above, as there is some difference in the number of main nerves in the leaflets, those in the specimens of King's Collector, No. 8462, being rather less numerous than in the other gatherings.

8. *CHISOCHETON ERYTHROCARPUS*, Hiern in Hook. fil. Fl. Br. Ind. I, 550. A tree; young branches rather stout, densely and minutely rusty-tomentose. *Leaves* equally pinnate, 12 to 15 in. long; leaflets 4 to 6 pairs, opposite, coriaceous, elliptic-oblong to broadly ovate, shortly abruptly and bluntly acuminate, cuneate or rounded at the slightly oblique base; upper surface glabrous except the puberulous midrib; lower softly and shortly rusty-pubescent; main nerves 6 or 7 pairs, ascending, curving; length 2·5 to 5·5 in., breadth 1·35 to 2 in., petiolules 2 in. *Panicles* clustered towards the ends of the branches, extra-axillary, about half as long as the leaves, minutely rusty-tomentose; their lateral branches short, horizontal, cymose. *Flowers* ·45 in. long, their pedicels shorter. *Calyx* cylindric, the mouth truncate, sometimes minutely toothed, densely tomentose. *Petals* 6, longer than the calyx, fleshy, narrowly elliptic, blunt, adpressed-sericeous outside, glabrous inside. *Staminal-tube* shorter than the petals and pistil, outside sericeous below and glabrous above, inside villous, with 5 or 6 rather deep blunt emarginate teeth; anthers 5 or 6, included, elongate. *Ovary* narrow, pubescent; *style* tapering; *stigma* cylindric, with glabrous central mammilla. *Fruit* sub-globose, nearly 2 in. in diam., minutely tomentose, blood-red (fide Maingay) when ripe. *Seeds* ex-arillate, flattened, 1 in. long, the testa thick, orange-red. C. De Cand. in Mon. Phan. I, 534.

Malacca: Maingay (Kew Distrib.) No. 322.

9. *CHISOCHETON ANNULATUS*, King n. sp. A tree; *leaves* 18 to 30 in. long, the petioles and rachises 4-angled, pubescent; leaflets 4 to 7 pairs, membraneous, oblong or elliptic-oblong, shortly and abruptly acuminate, the base cuneate, both surfaces with very minute pubescence; main nerves 12 to 14 pairs, oblique, rather prominent beneath; length about 9 in., breadth 3 to 3·5 in., petiolules ·25 in. *Panicles* solitary, supra-axillary, puberulous, about as long as the leaves, with scanty spike-like few-flowered branches which become shorter upwards. *Flower-buds* clavate, ·5 to ·6 in. long, contracted into a pseudo-stalk at the base, their true pedicels ·25 in. long. *Calyx* campanulate, rusty-tomentose outside, completely enveloping the petals in bud, with a thickened wavy band

about its middle, and 4 broad convenient triangular teeth. *Petals* 6 or more, the outer three sericeous outside and glabrous inside, the inner quite glabrous; all broadly elliptic, free from the staminal-tube. *Staminal-tube* shorter than the petals, cylindric, glabrescent, the mouth with shallow broad erose teeth. *Stamens* 12, attached at the very base of the tube; anthers linear-elongate. *Ovary* conic, apparently 5-celled; *style* cylindric, pubescent; *stigma* discoid, concave.

Perak; Scortechini No. 7000, Curtis No. 2693.

In its leaves, and also to some extent in its inflorescence, this agrees with the type specimen of *C. spectabile*, Miq., collected by Korthals in Borneo, and now in the Herbarium at Leiden. That specimen is in bud only, and neither Scortechini's nor Curtis's specimens have fully expanded flowers. The buds both of this and of *C. spectabile* are of the same clavate shape. Miquel does not describe the flowers of *C. spectabile*, and the buds in Korthal's type specimen are so young and so few, that I did not dare to dissect one of them. The buds on Scortechini's scanty specimens of this are also too young for accurate examination. But an examination of one of Mr. Curtis's discloses the structure above described. The flowers are remarkable because of the waved thickened band which runs round the exterior of the calyx just below the teeth. The ovary, moreover, of this appears to have 5 cells, whereas the species of the genus *Chisocheton* have only 2 or 4. This character together with the lengthening of the base of the flower into a pseudo-stalk and the annular thickening of the base of the calyx, approximate this species to the genus *Megaphyllea*. In the meantime I put it into *Chisocheton*. Good flowering specimens of this singular plant are much to be desired.

10. *CHISOCHETON MACROPHYLLUS*, King, n. sp. A tree 60 feet high. *Leaves* 5 or 6 feet long, the petiole and rachis obliquely 4-angled, subglabrous; leaflets membranous, opposite, oblong, the apex with a short blunt acumen; the base broad, rounded, unequal-sided: upper surface quite glabrous, the lower paler, minutely pubescent on the midrib and nerves when young; main nerves 18 to 20 pairs, spreading, rather prominent beneath when dry; length 5 to 13 in., breadth 3·5 to 4 in., petioles ·3 in. *Panicles* 2 to 3 feet long, narrow, puberulous; the branches rather distant, from 1 to 3·5 in. long, the ultimate branchlets cymulose, many-flowered. *Flowers* ·5 or ·6 in. long, narrow, on pubescent pedicels less than ·1 in. long. *Calyx* cupular, pubescent, about ·05 deep, its mouth obscurely 4-toothed or entire. *Petals* 4, many times longer than the calyx, linear with spathulate concave apices, puberulous on the outer, glabrous on the inner surface. *Staminal-tube* slightly shorter than the petals, adherent to them for half its length, outside glabres-

cent below but hairy near the mouth; inside villous; mouth wider than the tube with 8 rather deep linear 2- to 3- toothed lobes; *anthers* oblong, slightly exserted. *Ovary* broadly ovoid, sericeous like the slightly compressed style; *stigma* small, cylindric, with the upper surface lobed. *Fruit* sub-globular, narrowed at the base, 3 in. in diam., the pericarp leathery thick and fleshy; pedicel very stout, swollen, 1 in. long.

Penang: Curtis No. 2469. Perak: Curtis No. 2327. Singapore: Ridley No. 4767.

11. *CHISOCHETON MACROTHYRSUS*, King, n. sp. A tree 20 to 40 feet high. *Leaves* about 2 feet long, the petiole terete, the rachis 4-angled, glabrous; *leaflets* 2 to 4 pairs, thinly coriaceous, elliptic-oblong, minutely acuminate, the base cuneate, both surfaces glabrous; main nerves 10 to 14 pairs, prominent beneath; length 3·5 to 9 in., breadth 1·5 to 3·5 in., petiolules ·25 to ·5 in. *Panicles* longer than the leaves, angled, glabrous; the branches distant, the lower again branched, the ultimate branchlets everywhere cymose. *Flowers* ·5 in. long, on very short pubescent pedicels. *Calyx* tubular, about ·1 in. long, truncate or waved, pubescent. *Petals* 5, five times as long as the calyx, elliptic, thickened and concave at the apex, minutely tomentose outside, glabrous inside. *Staminal tube* shorter than and free from the petals, its apex truncate, with about 14 broad shallow teeth, sericeous on both surfaces except towards the apex; *anthers* 7 or 8, rather small, included, attached some way below the mouth. *Ovary* ovoid-conic, sericeous like the tapering style; *stigma* cylindric, glabrous, with a flat ring at its base. *Fruit* depressed-globular, sub-rugose and with several vertical ridges, minutely tomentose, 1·5 in. in diam.

Perak: Scortechini, Wray, King's Collector.

I have seen only a single specimen in which the fruit approaches maturity. The majority of the fruiting specimens are in a young stage, and the young fruits are deeply rugose and furrowed and have a small apical beak. None of the specimens I have seen have their leaves intact, and it is possible they may have more leaflets than I have described above.

12. *CHISOCHETON LAXIFLORUS*, King, n. sp. A tree 20 to 40 feet high. *Leaves* 1 to 2 feet long, glabrous; *leaflets* 4 or 5 pairs, opposite, thinly coriaceous, elliptic to elliptic-oblong, cuspidate, slightly narrowed at the base, both surfaces minutely reticulate; main nerves 10 to 15 pairs, curved, ascending, depressed above and prominent beneath when dry; length 5 to 9 in., breadth 1·75 to 3 in., petiolules ·2 in. *Panicles* solitary, extra-axillary, slender, with a few primary branches; the secondary branches short, few-flowered, the flowers usually in distant pairs, sessile, ·4 or ·5 in. long. *Calyx* puberulous outside, less than ·1 in. long,

shortly cylindric, mouth entire or sometimes obscurely crenate, truncate. *Petals* 4, many times longer than the calyx, linear, obtuse, slightly concave at the apex, puberulous outside, glabrous inside. *Staminal tube* nearly as long as the petals and free from them, villous outside, glabrous inside, the mouth slightly waved. *Anthers* 5, elliptic, included. *Ovary* small (in the male flowers), sericeous. *Style* longer than the staminal tube, sericeous at the base, otherwise glabrous, stigma cylindric. *Ovary* of female flower not seen. *Fruit* depressed-globose, tapering into a short pseudo-stalk, minutely tomentose, 1.5 in. in diam., crimson when ripe.

Perak: Scortechini, Nos. 219 and 388; King's Collector, Nos. 1876, 4348, 5735, 5765, 7783.

In many respects this resembles *C. patens*, Bl., but it has larger flowers and much less pyriform fruit. The staminal tube of this is moreover only slightly toothed at the apex, whereas that of *C. patens* has 6 long lanceolate teeth.

13. *CHISOCHETON PATENS*, Blume, Bijdr. 169. A tree 20 to 40 feet high. *Leaves* with the petiole and rachis almost glabrous, 1 to 3 feet long; leaflets 10 to 13 pairs, opposite or sub-opposite, thinly coriaceous, oblong-lanceolate, rarely oblong-elliptic, shortly acuminate, the base narrowed and unequal-sided; both surfaces glabrous, reticulate, the lower pale and with the 10 to 14 pairs of curved spreading nerves and also the reticulations prominent; length 4 to 7 in., breadth 1 to 2.5 in., petiole .15 to .4 in. *Male panicles* about as long as the leaves (the female shorter), supra-axillary, pendulous, glabrous, with numerous divergent branches the lower of which are compound, the middle spike-like, and the uppermost short and cymose. *Flowers* .35 in. long, on short rather stout pedicels. *Calyx* cupular, puberulous outside; the mouth entire, truncate or wavy. *Petals* 4, three or four times as long as the calyx, sub-spathulate elliptic, glabrous, longer than and quite free from the staminal-tube. *Staminal tube* free from the petals, cylindric, expanding slightly upwards, pubescent near the mouth, otherwise glabrous outside, pubescent inside, the mouth with 6 long lanceolate teeth which are slightly shorter than the 6 linear elongate anthers. *Ovary* very small, surrounded by a notched fleshy glabrous disc; *style* cylindric, pubescent; *stigma* cylindric, glabrous. *Fruit* pyriform, attenuated below into a thick pseudo-stalk, glabrous; length 2.25 in. of which the stalk-like part is 1 in. Miq. Fl. Ind. Bat. Vol. I, Pt. 2, 537; Ann. Mus. Lugd. Bat. IV, 29; C. De Cand. Mon. Phan. I, 528. *C. holocalyx*, Hiern in Hook. fil. Fl. Br. Ind. I, 551. C. De Cand. l. c. 529.

Malacca: Maingay (Kew Distrib.) No. 328. Singapore; Anderson No. 30, Hullett No. 800, Ridley No. 4763. Perak: Scortechini No. 324;

King's Collector Nos. 3312, 10750; Wray No. 1279. Penang: Curtis No. 1685. Pahang Ridley No. 4765.

This species, although a much smaller tree, very much resembles *C. divergens*, Bl. in its leaves and inflorescence. The leaflets, however, are of a thicker texture than those of *C. divergens* and they dry of a different colour. The flowers of the two are almost exactly alike in structure; but those of *C. divergens* are yellow and very fragrant, while those of *C. patens* are greenish-white and have a disagreeable odour like that of *Paederia foetida* and of some species of *Lasianthus*. The fruits of the two moreover differ, those of *C. divergens* being turbinate-globular or nearly so, of a yellow colour, and more or less tomentose; while the fruits of *C. patens* are of a deep red colour and glabrous when quite ripe. I have compared the type specimens of *C. patens*, Bl. and of *C. holocalyx*, Hiern., deposited, respectively, at Leiden and Kew, and I find the two to be identical.

14. CHISOCHETON DIVERGENS, Blume, Bijdr. 169. A tree 40 to 100 feet high; young branches glabrous, the bark dark-coloured. Leaves 9 to 18 in. long, the main rachis deciduously puberulous; leaflets 4 to 12 pairs, membranous, opposite or sub-opposite, narrowly oblong or oblong-lanceolate, shortly acuminate, slightly narrowed to the rounded or slightly cuneate unequal base; both surfaces glabrous, reticulate, the 10 to 12 pairs of curving ascending nerves prominent on the lower when dry; length 2.5 to 6 in., breadth 1.15 to 1.75 in., petiolules .15 to .25 in. Panicles solitary, supra-axillary, pendulous, about as long as the leaves, pyramidal, the lower branches of the male panicles 6 or 7 in. long, of the female 4 or 5 in., the ultimate branchlets of both cyme-like, dense, many-flowered. Male Flowers .25 in. long, on short pubescent pedicels. Calyx cupular, puberulous, the mouth entire or waved. Petals 4, three or four times as long as the calyx and slightly longer than the staminal-tube, recurved, elliptic, obtuse, sub-glabrous. Staminal-tube free from the petals, widely tubular, glabrous except a few strong hairs at the throat, the mouth with 6 lanceolate spreading teeth; anthers 6, linear-elongate, about as long as the teeth of the calyx. Ovary small, surrounded by a narrow fleshy glabrous disc; style cylindric, pubescent; stigma small, disc-like with an annulus at its base. Female flowers like the males, but usually without anthers; the ovary ovoid-conic, pubescent. Fruit obovoid or depressed-globose, tapering at the base into a pseudo-stalk, minutely tomentose, 1.5 in. in diam., 2-celled, seeds about 2. Miq. Fl. Ind. Bat. I, Pt. 2, 537; Ann. Mus. Lugd. Bat. IV. 28; C. De Cand. Mon. Phan. I, 529. *C. fragrans*, Hiern in Hook. fil. Fl. Br. Ind. I, 551; C. De Cand. l. c. 529.

Malacca: Griffith, No. 1062/1 Maingay, (Kew Distrib.) No. 324.

Perak; King's Collector, Nos. 4631, 4795, 6864? Burma: Wall. Cat. 8069.

I have compared the authentic specimens of the Leiden Herbarium of *C. patens*, Blume, with the type specimens at Kew of *C. fragrans*, Hiern; and I find them to agree exactly. I therefore adopt the older name. The male panicles of this are rather longer and wider at the base than the female panicles; but both are pyramidal. I believe the plant issued by Wallich as a *Cupania* (No. 8069 of his Catalogue) may belong to this. The specimens are in fruit only and were originally named by Wallich *Trichelia longissima*.

5. DYSOXYLUM, Blume.

Trees, mostly glabrous. *Leaves* pinnate; leaflets entire, opposite sub-opposite or alternate, more or less acuminate at the apex and oblique at the base, coriaceous. *Flowers* paniculate, racemose or spicate, hermaphrodite. *Calyx* 4- rarely 5-fid, dentate or partite or sub-entire, imbricated, not accrescent. *Petals* 4, rarely 5, oblong, spreading, valvate or slightly imbricated. *Staminal tube* cylindrical, dentate or crenulate at the mouth; *anthers* 6, 8 or 10, short, included or the tips exserted. *Disc* tubular, equal to or twice as long as the ovary, crenulate or entire at the mouth. *Ovary* usually 3- 4-celled; style about equalling the staminal tube; ovules usually 2 in each cell. *Capsule* globose or pear-shaped, coriaceous (often thickly so), 1- 4-celled, loculicidal; seeds arillate or exarillate, exalbuminous.—

DISTRIB. Species about 100, mostly found in the Malay Archipelago, but some in Australasia.

FLOWERS PENTAMEROUS. ... 1. *D. arborescens*.

FLOWERS TETRAMEROUS.

Inflorescence paniculate.

Panicles slender, lax, few-flowered.

Leaflets linear-lanceolate; flowers .6 in.

long ... 2. *D. angustifolium*.

Leaflets oblong-lanceolate, caudate-acu-

minate; flowers .15 in. long ... 3. *D. dumosum*.

Panicles with few branches; the branchlets

very short, spicate, distant; the flowers only .1 in. long, densely crowded ... 4. *D. interruptum*.

Panicles with many divaricating branches, many-flowered.

Leaflets minutely rugulose when dry, their main nerves indistinct ... 5. *D. acutangulum*.

Leaflets not rugulose when dry, their
main nerves distinct

Veins of leaflets winged ; flowers

·25 in. long ... 6. *D. venulosum*.

Veins of leaflets not winged.

Disc hairy, slightly exceeding

the sub-strigose ovary ;

flowers ·15 in. long ... 7. *D. thyrsoideum*.

Disc glabrous, half as long as

the style, slightly constrict-

ed below the thickened pi-

lose mouth, ovary densely

pilose ; flowers ·45 in. long 8. *D. turbinatum*.

Disc glabrous, slightly lon-

ger than the glabrous

ovary ; flowers ·2 in. long 9. *D. costulatum*.

Disc glabrous outside, pubes-

cent inside, much longer

than the densely adpressed-

pubescent ovary ; flowers ·5

in. long ... 10. *D. macrothyrsum*.

Inflorescence spicate or racemose.

Spikes or racemes from the stem or from
the branches below the leaves.

Disc membranous, glabrous, obscure-

ly crenate, longer than the densely

pilose narrowly ovoid ovary ;

flowers ·3 to ·35 in. long ; fruit

ovoid, apiculate, glabrous ... 11. *D. cauliflorum*.

Disc fleshy, longer than the tomen-

tose-lepidote sub-globular ovary ;

flowers ·25 in. long ; fruit ovoid,

rusty-tomentose ... 12. *D. Griffithii*.

Disc thinly fleshy, glabrous, crenu-

late, longer than the depressed

sericeous ovary ; flowers ·15 in.

long ; fruit obovoid, apiculate, ob-

scurely 4-angled, tawny-tomentose 13. *D. densiflorum*.

Disc membranous, glabrous outside,

pubescent inside, as long as the

ovoid-conic sparsely pilose ovary ;

flowers ·35 in. long ; fruit sub-

globose ... 14. *D. cuneatum*.

Spikes or racemes axillary.

Spicate cymes or racemes from 4 to 8 in. long.

Disc fleshy, glabrous, crenulate, slightly longer than the hemispheric densely puberulous ovary; flowers .2 in. long ... 15. *D. racemosum*.

Disc puberulous, with thickened rugulose pilose mouth; longer than the ovoid-conic pubescent ovary; flowers .6 in. long ... 16. *D. microbotrys*.

Spikes from 2 to 4 in. long.

Disc glabrous, longer than the puberulous 4-furrowed ovary; flowers .35 in. long ... 17. *D. flavescens*.

Spikes or racemes not more than 2 in. long.

Leaves not rugulose when dry.

Disc fleshy, annular, crenulate, shorter than the conic pubescent ovary; flowers .5 in. long ... 18. *D. andamanicum*.

Leaves rugulose or papillose.

Disc fleshy, glabrous, 8- to 9- toothed, exceeding the hemispheric ridged puberulous ovary; flowers .2 in. long ... 19. *D. rugulosum*.

Flower buds globose, .15 in. in diam.; calyx campanulate; disc none, or very small, ovary broadly ovoid ... 20. *D. papillosum*.

1 *DYSOXYLUM ARBORESCENS*, Miq. in Ann. Mus. Lugd. Bat. IV, 24. A tree 20 to 30 feet high. *Leaves* 6 to 9 in. long, unequally pinnate, glabrous; leaflets 2 to 3 pairs, membranous, opposite or sub-opposite, elliptic (sometimes rather broadly so), slightly obovate, shortly abruptly and obtusely acuminate, the base very cuneate; main nerves 6 to 8 pairs spreading, curving, not prominent on either surface; length 2.5 to .5 in., breadth 1.25 to 2.25 in., the odd leaflet usually the largest; petiolules slender, .3 to .5 in., that of the odd leaflet often 1 in. *Panicles* extra-axillary, solitary, 1.5 to 4 in. long, with a few short lax-flowered divaricating branches. *Flowers* .25 in. long, on thin pedicels of the same length. *Calyx* a very shallow obscurely toothed cup. *Petals* 5, linear, slightly thickened and narrowed towards the apex, glabrous, longer than the sta-

minal tube. *Staminal tube* widely cylindric, inflated or not at the base, shorter than the style, glabrous, with 10 broad shallow sub-crenate teeth; *anthers* small, ovate, included, or the tips exerted. *Disc* widely tubular, thick, fleshy, sub-crenulate, longer than the ovary. *Ovary* depressed, ovoid-globular, pubescent, 4-celled; *style* cylindric, sparsely pubescent below, glabrous above; *stigma* discoid with a broad projecting annulus at its base. *Fruit* turbinate, with 3 or 4 (sometimes only 2) vertical grooves, glabrous, not narrowed into the stalk, 1·25 in. in diam., 2- to 4- seeded. *Seeds* ovoid, apparently ex-arillate. C. De Cand. Mon. Phan. I, 489, (excl. syn. *D. lampongum*, Miq.). *D. Maingayi*, Hiern in Hook. fl. Fl. Br. Ind. I, 547; C. De Cand. l. c. 490. *Goniocheton arborescens*, Blume Bijdr. 177: Miq. Fl. Ind. Bat. I, pt. 2, p. 540. *Hartigsea acuminata*, Miq. Fl. Ind. Bat. Suppl. 196, 504. *Trichelia arborescens*, Spreng. Syst. Vol. IV, cur. post. p. 252.

Malacca: Maingay (Kew Distrib.) No. 359. Perak: Scortechini, Wray. S. Andaman; King's Collectors. DISTRIB. the Malayan Archipelago.

The flowers of some of the Andamans specimens are 6-merous.

2. *DYSOXYLUM ANGUSTIFOLIUM*, King n. sp. A glabrous tree; young branches slender, terete. *Leaves* 10 to 12 in. long, equally pinnate; leaflets about 5 pairs, opposite, membranous, linear-lanceolate, the base much narrowed; main nerves 9 to 12 pairs, oblique, little curved, obsolete on the upper, faint on the lower, surface; length 3·5 to 5·5 in., breadth 5 to 6·5 in., petiolules ·25 in. *Panicles* extra-axillary, slender, lax, 1·5 to 4·5 in. long. *Flowers* ·6 in. long, each at the apex of a short minutely bracteolate branchlet. *Calyx* shortly cupular, with 4 triangular teeth, glabrous, fleshy, tapering below into a short fleshy pedicel. *Petals* 4, many times longer than the calyx, linear-oblong, sub-acute, slightly thickened and connivent at the apex, minutely puberulous outside, glabrous inside. *Staminal tube* nearly as long as the petals, cylindric, rather fleshy like the petals, glabrous, very slightly wider at the obscurely 8-toothed apex; *anthers* 8, elliptic-oblong, included. *Disc* tubular, much longer than the ovary, and one-third of the length of the style, fleshy, glabrous except at the thickened obscurely 8-toothed pubescent mouth. *Ovary* ovoid, 4-angled, puberulous, 4-celled, tapering into the long 4-angled puberulous style; *stigma* slightly exerted, rather small, discoid, with a broad basal annulus. *Fruit* (unripe) obovoid, tapering much at the base, glabrous, about 1 in. long, peduncle 1 in.

Pahang; Ridley, Nos. 2656 and 5840.

The flowers of this have a strongly alliaceous odour.

3. *DYSOXYLUM DUMOSUM*, King, n. sp. A shrub 3 to 6 feet high.

Leaves 5 to 14 in. long, equally pinnate, the petioles angled and channelled in front; *leaflets* opposite, 2 or 3 rarely 5 pairs, membranous, oblong-lanceolate, shortly and bluntly caudate-acuminate, much narrowed to the base; main nerves 7 or 8 pairs, curved, quite obscure on both surfaces, length 2·5 to 4·5 in. rarely 5 in.; breadth ·75 to 1·45, rarely 1·75 in., petiolules 2 in. *Panicles* shorter than the leaves, extra-axillary, pedunculate, with a few spreading scantily-flowered branches in the upper part, or racemose and branched from the base, 1·5 to 4 in. long. *Flowers* ·15 in. long, on bracteolate pedicels as long as or longer than themselves. *Calyx* cupular, much shorter than the petals, glabrous, with 4 (rarely 5) small teeth. *Petals* 4, slightly unequal, broadly oblong with truncate bases, obtuse, the apex thickened and slightly incurved, glabrous or sub-glabrous. *Staminal tube* shorter than the petals and adherent to their bases, widely cylindric, glabrous, the mouth with 8 broad shallow emarginate teeth; anthers alternate with the teeth, shortly ovate, sub-exserted. *Disc* fleshy in the fertile female flowers, slightly longer than the ovary and lobed; in the fertile male flower shorter and entire. *Ovary* depressed, pilose; *style* cylindric, sparsely pilose below; *stigma* in the fertile female broadly discoid, 5-angled, with an annular disc beneath it, in the fertile male cylindric. *Fruit* depressed-globular, glabrous, ·5 in. in diam., crowned by the base of the style, 4-celled, with 3 or 4 shining black seeds.

Perak : Scortechini, King's Collector. Johore : Ridley, No. 4194.

In habit this resembles *D. arborescens*, from which, however, it is at once distinguished by its equally pinnate leaves and tetramerous flowers.

4. *DYSOXYLUM INTERRUPTUM*, n. sp. King. A tree 30 to 40 feet high; young branches cinereous-pubescent. *Leaves* 24 to 30 in. long, equally pinnate; leaflets about 10 pairs, membranous, sub-opposite or opposite, oblong to elliptic-oblong, shortly and sharply acuminate, the base cuneate; upper surface glabrous, the nerves and midrib pubescent; lower surface puberulous, the 18 to 24 pairs of straight sub-ascending main nerves rather prominent and with long sparse hairs; length 5 to 7 in., breadth 2·25 to 2·75 in., petiolules ·1 to ·2 in. *Panicles* solitary, slightly supra-axillary, with few spreading branches; the ultimate branchlets very short, distant; the flowers ovoid, densely crowded, sessile, ·1 in. long. *Calyx* cupular, pubescent, with 4 or 5 triangular acute spreading teeth. *Petals* 4, longer than the calyx, erect, valvate, elliptic, sub-acute, the sides straight, pubescent outside, puberulous inside. *Staminal tube* shorter than the petals, cylindric, glabrous, the mouth with 8 rather broad bifid teeth. *Anthers* 8, short, elliptic, included. *Disc* shortly cylindric, longer than the ovary, fleshy, glabrous; its

mouth with 8 obscure broad blunt teeth. *Ovary* depressed and broadly ovoid, pilose, 3-celled; style short, stout: *stigma* thickly discoid with an annulus at its base. *Fruit* unknown.

Perak: King's Collector, No. 6349.

A very distinct species distinguished at once by its small densely crowded flowers in interrupted spicate panicles.

5. *DYSOXYLUM ACUTANGULUM*, Miq. Fl. Ind. Bat. Suppl. 196, 503; Ann. Mus. Lugd. Bat. IV., 26. A glabrous tree, the young branches rather stout with pale brown striate bark. *Leaves* 6 to 12 in. long, equally pinnate: the rachis and petiole 4-angled: leaflets 3 or 4 pairs, coriaceous, opposite or sub-opposite, unequal-sided especially towards the more or less acute base, elliptic or ovate, or sometimes slightly obovate, the apex acute or shortly acuminate, both surfaces minutely rugulose and of a pale olivaceous colour when dry; main nerves imperceptible; length 2·5 to 4·5 in., breadth 1·25 to 2·2 in., petiolule ·2 to ·25 in. *Panicles* 2·5 to ·4 in. long, spreading, puberulous, *Flowers* rather crowded, ·35 in. long. *Calyx* puberulous, very shallow, with 4 deep reflexed triangular teeth. *Petals* 4, thin, much larger than the calyx, oblong, sub-acute, puberulous on both surfaces. *Staminal tube* a little shorter than the petals, cylindric, the mouth with 8 rather deep sharp teeth, striate, puberulous on both surfaces; *anthers* 8, oblong, rather small, slightly exerted. *Disc* widely tubular, slightly exceeding the ovary, fleshy, its mouth slightly inflexed, obscurely 8-toothed. *Ovary* adpressed-pubescent, broadly ovoid, tapering into the long style: style glabrescent in its upper part, adpressed-pubescent in the lower. *Stigma* exerted, shortly cylindric, with a small annulus at its base. *Fruit* obovoid, 3 in. long; the pericarp very coriaceous, glabrous, pale brown when dry and minutely rugulose, 3-celled. *Seeds* one in a cell, ellipsoid and apparently when fresh embedded in pulp. C. DC. in Mon. Phan. I., 525.

Singapore: Ridley, No. 3828. Perak: Scortechini, No. 1048. *DISTRIB.* Bangka.

The late Fr. Scortechini collected only a single specimen of this which is in flower, and Mr. Ridley collected it in fruit in Singapore. These specimens agree absolutely in their leaves with a specimen from Bangka now in the Leiden Herbarium on which Miquel founded the species.

Miquel does not describe the flowers, and the specimen lent to me by the Leiden Herbarium has none. In the Leiden Annals, Miquel expresses a doubt whether this plant may not be Aurantiaceous. The flowers (which Miquel had never seen) are however unmistakably Meliaceous, and the leaflets moreover are not pellucid-dotted.

6. *DYSOXYLUM VENULOSUM*, King, n. sp. A tree 50 to 80 feet high; young branches rather stout, angled, puberulous. *Leaves* 12 to 18 in. long, the petiole and rachis angled and puberulous, equally or unequally pinnate; leaflets 7 to 14, membranous, alternate, oblong, slightly unequal-sided, acuminate, the base much narrowed and oblique; both surfaces glabrous, the 13 to 15 pairs of oblique curving main nerves indistinct on the upper, rather prominent on the lower, the veins on both surfaces prominent and winged when dry; length 5 to 7 in., breadth 1.35 to 1.75 in., petiolules .25 in. *Panicles* extra-axillary, 6 to 8 in. long, glabrescent; the branches numerous, short, sub-horizontal, few-flowered. *Flowers* .25 in. long; their pedicels about the same length, jointed at the middle. *Calyx* cupular, with 4 shallow teeth, glabrous. *Petals* 4, much longer than the calyx, densely hairy, puberulous externally, sparsely so internally, oblong, obtuse, the apex slightly thickened and inflexed. *Staminal tube* slightly shorter than the petals, glabrous, cylindric, its mouth irregularly and minutely toothed; anthers 8, oblong, inserted below the mouth of the tube. *Disc* cylindric, fleshy, glabrous, about as long as the ovary, the mouth with 4 broad minutely erose teeth. *Ovary* ovoid, hoary-pubescent, tapering into the long cylindric sub-glabrous style; *stigma* slightly exserted, thickly discoid with an annulus at its base. *Fruit* unknown.

Perak: King's Collector, No. 1036.

7. *DYSOXYLUM THYRSOIDEUM*, Griff. ex Hook. fil. Fl. Br. Ind. I., 547. A tree; leaves 12 to 16 in. long, their petioles and rachises angled; leaflets about 8, alternate, coriaceous, elliptic-oblong to elliptic, shortly acuminate, slightly narrowed to the oblique base, both surfaces quite glabrous; main nerves 6 to 8 pairs, curved, ascending, slightly depressed in the upper and prominent on the lower surface when dry; length 4.5 to 8.5 in., breadth 1.75 to 3 in., petiolules .3 in. *Panicles* slightly extra-axillary, pyramidal, with stout rachises less than half the length of the leaves; their main branches divaricating, the ultimate racemose; flowers numerous, .15 in. long, their pedicels nearly as long. *Calyx* one-third of the length of the petals, cupular, coarsely and irregularly 4-toothed, glabrous. *Petals* 4, oblong, obtuse, glabrous. *Staminal tube* shorter than the petals and attached to them, cylindric, glabrous outside, pubescent inside, its mouth with 8 broad sub-crenate teeth; *anthers* short, ovate, included. *Disc* tubular, fleshy, hairy, slightly exceeding the ovary, truncate. *Ovary* narrowly ovoid, sub-strigose, 3-celled; *style* cylindric, thick, as long as the staminal tube; *stigma* exserted, discoid with a basal ring. *Fruit* (fide Hiern) "obovoid, fleshy, 2-3-lobed, umblicate, nearly 1 in. long; fruiting peduncles woody, stout, seeds ex-arillate." C. DC. in Mon. Phan. I., 481.

Malacca, Griffith, (Kew Distribution) No. 1053. Penang: Curtis, Nos. 2467, 2468. Andamans: King's Collectors.

Var. *Andamanica*: flowers .25 in. long, calyx very short: panicles sometimes as long as the leaves, lax.

S. Andamans. King's Collectors.

This differs from typical *D. thyrsoides* chiefly in the points above noted. When better specimens of the typical Malacca form are obtained, characters may be found sufficient to separate the two specifically.

8. *DYSOXYLUM TURBINATUM*, King n. sp. A small tree 12 to 20 feet high; young branches rather stout, the bark pale brown and striate. *Leaves* 10 to 16 in. long, the petioles and rachises glabrous, terete, equally pinnate; leaflets 2 to 4 pairs, sub-opposite, thinly coriaceous, elliptic to elliptic-oblong, shortly and bluntly acuminate, the base rounded or slightly narrowed, not oblique; both surfaces glabrous, the lower sub-glaucous, very minutely dotted, the nerves pubescent when young; main nerves 8 to 11 pairs, curved, spreading, very prominent on the lower, slightly depressed on the upper surface; length 3 to 6 or even 8 in., breadth 1.5 to 2.5 in. or even 3.5 in., petiolules .35 in. *Panicles* supra-axillary, 3 to 11 in. long, puberulous, rather slender, with few distant minutely bracteolate branches each bearing 5 to 10 flowers mostly in its upper half. *Flowers* .45 in. long. *Calyx* cupular, pubescent, narrowed to a short fleshy pedicel, its mouth with 4 short triangular teeth. *Petals* 4, linear-oblong, thickened and slightly concave at the apex, minutely adpressed-pubescent outside, with a few fleshy hairs inside at the apex, otherwise glabrescent. *Staminal tube* cylindric, slightly shorter than the petals, the mouth with 8 shallow broad truncate teeth, puberulous outside, glabrous inside. *Anthers* oblong, short, included. *Disc* half as long as the style, tubular, slightly constricted below the thickened pilose mouth, otherwise glabrous. *Ovary* narrowly ovoid, densely pilose; style 4-angled, glabrescent; stigma slightly exserted, small, discoid, with a basal annulus. *Fruit* depressed-globular, tapering at the base into a short pseudo-stalk, covered with brownish pale-edged scales, 1.5 in. length (excluding the pseudo-stalk) and slightly more in diameter.

Perak: King's Collector, No. 8751. Johore: Herb. Ridley, No. 4060. Malacca: Griffith.

In the above description the flowers are described from the specimens of Mr. Ridley and of my own collector, and the fruit from a single Griffithian specimen from Malacca which has no flowers, the three being in my opinion identical.

9. *DYSOXYLUM COSTULATUM*, Miq. in Ann. Mus. Lugd. Bat. Vol. IV.,

21. A glabrous tree 40 to 50 feet high. *Leaves* 9 to 14 in. long; *leaflets* sub-coriaceous, opposite, about 4 pairs, elliptic-oblong or elliptic, cuspidate or shortly acuminate; the base acute, slightly oblique; main nerves 10 to 12 pairs, curved, spreading, stout and prominent on the lower surface; length 3·5 to 6 in., breadth 1·5 to 2·75 in., petiolules about ·3 in. *Panicles* axillary or terminal, about half as long as the leaves or less; their branches divaricating and racemoid, glabrous. *Flowers* not crowded, about ·2 in. long, on short pedicels, bracteolate; pedicels cylindric in bud. *Calyx* a very short obscurely 4-toothed cup. *Petals* 4, oblong, obtuse, minutely puberulous externally. *Staminal tube* free from and nearly as long as the petals, cylindrical, the mouth with 8 broad shallow crenulate teeth, glabrous outside, villous inside. *Anthers* 8, short, ovate, included. *Disc* tubular, glabrous, crenately 4-toothed, longer than and surrounding the ovary. *Ovary* glabrous, narrowly ovoid, tapering into the cylindric style. *Stigma* slightly exerted, discoid with a band round its base. *Fruit* depressed-globular with 3 shallow vertical grooves; tapering at the base into a pseudo-stalk, 1·5 in. or more in diam., 4-celled; the pericarp woody, glabrous. Seeds sub-globular. C. De Cand. in Mon. Phan. I, 503. *D. brevipes*, Hiern in Hook. fil. Fl. Br. Ind. I, 560; C. DC. in Mon. Phan. I, 503. *Hartighsea costulata*, Miq. Fl. Ind. Bat. Suppl. 196, 505.

Malacca: Griffith; Maingay, Nos. 319, 320 (Kew Distrib.), Stolickza, Wray, King's Collector. Pahang: Ridley. Singapore: Ridley. Distrib. Sumatra.

The type specimens of *D. brevipes* Hiern at Kew agree exactly with those of the older *D. costulatum* Miq. in the Royal Herbarium at Leiden.

10. DYSOXYLUM MACROTHYRSUM, Miq. in Ann. Mus. Lugd. Bat. IV., 20. A tree 30 to 60 feet high; young branches rather stout, striate. *Leaves* 11 to 16 in. long, equally pinnate, the petioles and rachises puberulous; *leaflets* thinly coriaceous, 3 or 4 pairs, opposite, oblong-lanceolate to elliptic-oblong or elliptic, shortly acuminate, the base cuneate and slightly oblique; upper surface glabrous except the sometimes puberulous midrib, the lower glabrous; main nerves 8 to 11 pairs, spreading, prominent and almost winged on the lower faintly depressed on the upper surface; length 3 to 5·5 in. or even 7 in., breadth 1·5 to 2·25 in., petiolules ·25 to ·4 in. *Racemes* slightly supra-axillary, slender, puberulous, few-flowered, 4 to 7 in. long. *Flowers* ·5 in. long, distant, on short bracteolate pedicels. *Calyx* a short fleshy rugulose puberulous cup, with 4 broad triangular teeth. *Petals* 4, deflexed, many times longer than the calyx, narrowly oblong, slightly widened at the base; the apex sub-acute, slightly thickened and inflexed, externally with dense pale adpressed hairs, internally glabrescent. *Staminal tube*

shorter than the petals, cylindric, adpressed-pubescent outside, the mouth almost entire or minutely toothed. *Anthers* 8, linear-elliptic, their apices not reaching the mouth of the tube. *Disc* much longer than the ovary, cylindric, glabrous externally, softly pubescent internally especially at the acutely 8-toothed mouth. *Ovary* narrowly ovoid-conic, tapering into the long glabrous cylindric style, 4-angled, densely adpressed-pubescent; stigma exserted, thickly discoid, rugulose, with a narrow annulus at its base. *Fruit* turbinate, with four shallow vertical grooves and four broad rounded angles, sub-glabrous, crowned for a time by the persistent stout short style, when fully ripe white slightly tinged with pink, about 1.25 in. long, and 1.5 in., or more in diam. C. DC. in Mon. Phan. I, 485. *D. Lampongum*, Miq. Fl. Ind. Bat. Suppl. 196, 303 (excl. var. B., fide Miq. Ann. Mus. Lugd. Bat. IV., 20.)

Perak: King's Collector, Nos. 5428, 6788, 10440; Wray, Nos. 2329, 3072. Selangore: Ridley, No. 1892. Distrib. Borneo.

I follow Miquel and M. C. deCandolle in keeping this species up. It is, however, very closely allied to *D. excelsum*, Bl. The panicles of Perak specimens are rather shorter and fewer-flowered than in those collected in Borneo; in other respects they agree.

11. *DYSOXYLUM CAULIFLORUM*, Hiern in Hook. fil. Fl. Br. Ind. I., 549. A tree 30 to 50 feet high. *Leaves* 1 to 2 feet long, their petioles and rachises deciduously rusty-puberulous, angled, unequally pinnate; leaflets 9 to 13, membranous, opposite or alternate, oblong-elliptic or elliptic, shortly acuminate, the base cuneate or rounded at one side and obliquely cut away at the other; both surfaces glabrous except the pubescent midrib; main nerves 8 to 13 pairs, spreading, rather prominent on the lower surface; length 4 to 7 in. occasionally 12 in., breadth 1.75 to 2.75 in., petiolules .2 to .3 in. *Spikes* from 1 to 3 in. long, tawny-tomentose, in dense clusters on rugose woody tubercles from the stem. *Flowers* .3 to .35 in. long, their pedicels about .1 in., bracteolate at the base. *Calyx* cupular, with 3 or 4 broad irregular teeth, pubescent. *Petals* 4, oblong, obtuse, glabrous inside, glabrous or puberulous outside, free from the staminal tube. *Staminal tube* cylindric, glabrescent or sparsely sericeous outside, sericeous inside, the mouth with 8 broad shallow bifid teeth; *anthers* 8, ovate, included. *Disc* tubular, membranous, longer than the ovary, glabrous, the mouth obscurely crenate. *Ovary* narrowly ovoid, densely pilose; the style cylindric, sparsely pilose in the lower, glabrous in the upper half. *Stigma* slightly exserted, broadly discoid with a narrow annulus at its base. *Fruit* ovoid, apiculate, tapering slightly at the base, substriate, glabrous, red-coloured, splitting into 4 valves. *Seeds* sub-globular, plano-convex, .5 in. long. C. DC. in Mon. Phan. I., 498.

Malacca: Griffith, Maingay, No. 327 (Kew Distrib.). Singapore; Anderson, Hullet. Perak: Scortechini, Wray, King's Collector.

12. *DYSOXYLUM GRIFFITHII*, Hiern in Hook. fil. Fl. Br. Ind. I., 549. A tree. *Leaves* 12 to 18 in.; leaflets 9 to 13, membranous, alternate, oblong-lanceolate, acuminate, the base cuneate, glabrous, shining, (olivaceous when dry); main nerves numerous, spreading, indistinct on both surfaces, the midrib thin but slightly prominent on the lower; length 3 to 5 in., breadth 1 to 1·5 in., petiolules ·1 in. *Racemes* from the axils of fallen leaves, ·5 to 1·5 in. long, stout, minutely bracteolate. *Flowers* ·25 in. long, their pedicels less than ·1 in. *Calyx* nearly flat, very short. *Petals* 4, oblong, obtuse, puberulous outside. *Staminal tube* slightly shorter than the petals, cylindric; its mouth with 8 broad shallow sub-emarginate teeth, puberulous outside; anthers 8, ovate, their tips exserted. *Disc* shortly cylindric, crenulate, fleshy, longer than the ovary. *Ovary* sub-globular, 4-angled, minutely tomentose-lepidote, 3- to 4-celled. *Style* as long as the staminal tube, 4-angled, puberulous: *stigma* discoid, with an annulus at its base. *Fruit* unknown. C. DC. in Mon. Phan. I., 497. *Hartighsea ramiflora*, Griff. Notulæ IV., 501.

Malacca, Griffith.

This does not appear to have been collected since Griffith originally found it (1845) at Malacca. It is a very well-marked species, and Griffith's original description of it is, in all respects except that of fruit, full and clear.

13. *DYSOXYLUM DENSIFLORUM*, Miq. in Ann. Mus. Lugd. Bat. IV, 9. A tree 20 to 40 feet high. *Leaves* unequally pinnate, 15 to 20 in. long, their petioles and rachises angular, deciduously puberulous. *Leaflets* 11 to 13, opposite or alternate; the terminal larger than the others; more or less obovate and with a longer petiolule; lateral leaflets elliptic or elliptic-oblong, slightly oblique, acute or shortly acuminate, the base rounded or sub-cuneate and unequal, both surfaces glabrous; main nerves 10 to 12 pairs, spreading, curved, slightly prominent beneath; length 4·5 to 7 in., the terminal 1 or 2 in. longer; breadth 2 to 2·5 in., the terminal sometimes 3 in.; petiolules ·15 in., the terminal ·75 to 1 in. *Spikes* in clusters from woody tubercles on the stem, 1 to 2 in. long, tawny-tomentose. *Flowers* (in bud only), about ·15 in. long, sub-globular, their pedicels slightly shorter with bracteole at the base. *Calyx* almost as long as the petals, campanulate, coarsely pubescent, its mouth with 4 large irregular teeth. *Petals* 4, free, slightly imbricate, sub-orbicular (in bud), the apex slightly inflexed. *Staminal-tube* nearly as long as the petals, glabrous, widely tubular, divided almost to the base into 8 broad sub-truncate erose teeth; *anthers*

8, included, elongate-elliptic, alternate with the lobes. *Disc* cylindric, short but longer than the ovary, thinly fleshy, crenulate, glabrous. *Ovary* depressed, 4-celled, sericeous as is the base of the short stout style; *stigma* slightly exserted, discoid. *Fruit* (young) narrowly obovoid, shortly apiculate, narrowed at the base into a pseudo-stalk, obscurely 4-angled, densely but minutely tawny-tomentose, 1.5 in. long, including the pseudo-stalk. C. DC. Monog. Phan. I, 499. *Epicharis densiflora*, Blume Bijdr. 167; Miq. Flor. Ind. Bat. Vol. I, pt. 2, p. 539. *Epicharis altissima*, Blume ex Miq. l.c. *Guarea densiflora*, Spreng., Syst. IV, 251.

Perak: King's Collector, Nos. 4934, 8826, 10093 and 10443. Wray No. 437. Scortechini, No. 1661. DISTRIB. Java, Sumatra.

In the youngest stages the fruit is ovoid: as it ripens it becomes obovoid and the base becomes narrowed into a pseudo-stalk.

14. *DYSOXYLUM CUNEATUM*, Hiern in Hook. fil. Fl. Br. Ind. I, 551. A large tree. *Leaves* 18 to 30 in. long, unequally pinnate; leaflets about 13, sub-coriaceous, opposite or sub-opposite, elliptic-oblong, shortly cuspidate; the base cuneate, unequal-sided; both surfaces glabrous, the lower punctate; main nerves 14 to 17 pairs, spreading, slightly prominent beneath when dry; length 4 to 7 in., breadth 2 to 3 in.; petiolules .15 in., stout, that of the terminal leaflet .75 in. *Spikes* cinereous-tomentose, only a few inches long in flower, but elongating much in fruit, (from the branches below the leaves?) clustered. *Flowers* .35 in. long, sub-sessile, bracteolate. *Calyx* half as long as the petals, campanulate, with 4 obtuse irregular deep teeth, pubescent. *Petals* 4, oblong, sub-imbricate, sub-glabrous. *Staminal-tube* longer than the petals, glabrescent outside, villous inside, the mouth with 8 obtuse shallow teeth. *Anthers* 8, shortly ovate, included. *Disc* membranous, tubular, about as long as the ovary, glabrous outside, pubescent inside, its mouth minutely crenulate. *Ovary* ovoid-conic, pilose; style cylindric, sparsely pilose in the lower part, glabrous above, *stigma* discoid with an annulus at its base. *Fruiting-spike* half as long as the leaves: ripe fruit sub-globose, about 1 in. in diam., sub-glabrous, the pericarp splitting into about 4 valves; seeds oblong, plano-convex, .75 in. long, C. DC. in Mon. Phan I, 496.

Malacca: Maingay (Kew DISTRIB.), No. 322-2.

Known only by Maingay's scanty specimens; allied to *D. cauliflorum* in inflorescence flowers and fruit.

15. *DYSOXYLUM RACEMOSUM*, King n. sp. A shrub, all parts glabrous except the young shoots and the inflorescence. *Leaves* 12 to 18 in. long, equally pinnate. *Leaflets* membranous, alternate, elliptic-oblong, the apex shortly acuminate, the base broad, slightly unequal; main nerves 8 to 10 pairs, curving, spreading, slightly prominent beneath,

length 5 to 8 in., breadth 2·25 to 3 in., petiolules ·25 in. *Racemes* slightly supra-axillary, solitary, 4 to 5 in. long, puberulous. *Flowers* scattered, ·2 in. long, on slightly shorter thick bracteolate pedicels. *Calyx* a shallow puberulous cup with 4 obscure shallow lobes. *Petals* 4, much longer than the calyx, elliptic, slightly oblique, the apices slightly concave and thickened, the bases truncate, puberulous on both surfaces. *Staminal-tube* slightly shorter than the petals and style, widely cylindric, sparsely puberulous, the mouth with 8 broad 3-toothed lobes. *Anthers* shortly ovate, their apices exserted. *Disc* slightly longer than the ovary, shortly cylindric, fleshy, glabrous, crenulate. *Ovary* hemispheric, densely puberulous, tapering into the thick style. *Stigma* subcapitate, with an annular disc at its base. *Fruit* ovoid, deciduously rusty-puberulous with round smooth pits, the pericarp leathery; length 1·5 to 2 in., diam., ·9 to 1·35 in.

S. Andaman and Nicobar Islands; King's Collectors.

This bears, especially in its inflorescence, a resemblance to *D. grande*, Hiern; but this is quite glabrous, while that has leaves very pubescent beneath; the fruit also is different.

Var. *arborea*; 20 feet or more in height, leaves up to 20 in. long, leaflets often much narrowed to the base, longer and with more nerves; spikes often 12 in. long.

16. *DYSOXYLUM MICROBOTRYS*. King n. sp. A tree 40 to 60 feet high. *Leaves* 12 to 20 in. long, equally pinnate, their petioles and rachises glabrescent or glabrous; leaflets thinly coriaceous, opposite, about 3 pairs, elliptic or elliptic-oblong, broadly cuspidate, the base cuneate, both surfaces glabrous; main nerves 9 to 11 pairs, oblique, rather straight, slightly prominent beneath when dry; length 6 to 10 in., breadth 2·5 to 3·5 in., petiolules ·25 to ·35 in. *Cymes* spike-like, solitary, extra-axillary, 4 to 8 in. long, few-flowered. *Flowers* ·6 in. long, usually solitary, on pedicels ·15 in. long, bracteolate at the base. *Calyx* a shallow slightly 4-toothed puberulous rugulose cup. *Petals* 4, puberulous, oblong, slightly widened at the base; the apex sub-acute, thickened and incurved. *Staminal-tube* slightly shorter than the petals and style, everywhere puberulous; its mouth not expanded but with many broad shallow obscure teeth. *Anthers* 8, narrowly elliptic, inserted about their own length below the mouth. *Disc* longer than the ovary, tubular, puberulous; the mouth thickened, rugulose, pilose. *Ovary* ovoid-conic, pubescent; *style* 4-angled, pubescent in its lower, glabrous in its upper, half; *stigma* discoid, with a narrow annular band at its base, 4-celled, each cell with 2 ovules. *Fruit* pyriform, the top often much flattened, 1·5 to 2 in. long, and from 1·25 to 1·5 in. in diam., sub-glabrous, the pericarp rather thick. *Seeds* about ·75 in. long, plano-convex.

Perak: King's Collector, Nos. 10551, 10580, and probably also No. 10181.

17. *DYSOXYLUM FLAVESCENS*, Hiern in Hook. fil. Fl. Br. Ind. I, 549. A tree. *Leaves* 1 to 2 feet long; leaflets 9 to 13, membranous, alternate, elliptic, oblique, shortly acuminate, glabrous; the base slightly oblique, rounded; main nerves numerous, sub-horizontal, very indistinct on both surfaces, the midrib prominent especially on the lower; length 3 to 5 in., breadth 1.25 to 2 in., petiolules .2 to .25 in. *Spikes* axillary, 2 to 4 in. long. *Flowers* crowded, .35 in. long, sub-sessile, 4-merous, puberulous. *Calyx* very short, nearly flat, 4-toothed, roughly puberulous. *Petals* 4, minutely pilose outside, glabrous inside, slightly imbricated, pale yellow. *Staminal-tube* glabrous below, slightly pilose above, its mouth crenate. *Anthers* 8 or 10, ovate, included. *Disc* glabrous, exceeding the ovary, dull reddish-orange, its mouth entire or undulate. *Ovary* minutely 4-furrowed, hairy, 4-celled; style cylindrical, hairy; *stigma* discoid. C. DC. in Mon. Phan. I, 494.

Malacca: Maingay (Kew Distrib.), No. 321.

This is known only by Maingay's scanty and incomplete specimens. The preceding description is largely taken from Maingay and Hiern.

18. *DYSOXYLUM ANDAMANICUM*, King n. sp. A tree 20 to 30 feet high. *Leaves* 6 to 10 in. long, unequally pinnate, the petiole and rachises angled, very pale when dry; leaflets 3 to 5, membranous, alternate, oblong to ovate, slightly oblique, shortly and bluntly acuminate, the base cuneate or rounded, both surfaces glabrous; main nerves 6 to 10 pairs, spreading: length 3 to 5 in., breadth 1.35 to 1.75 in., petiolules .25 in. *Spikes* slightly supra-axillary, 1 to 2 in. long, few-flowered, puberulous. *Flowers* .35 in. long, their pedicels about 2 in., puberulous. *Calyx* a shallow minutely 4-toothed glabrous cup. *Petals* 4, much longer than the calyx and slightly imbricate, oblong, sub-acute, convex at the apex, pale puberulous especially externally, reflexed, rarely deciduous. *Staminal tube* shorter than the petals, widely cylindric, slightly inflated near the base, slightly puberulous, the mouth with 9 or 10 broad erose teeth. *Stamens* 8 to 10, alternate with the teeth; *anthers* shortly ovate, slightly exserted. *Disc* fleshy, annular, crenulate, shorter than and adherent to the ovary at its base. *Ovary* conic, densely white pubescent, tapering into the stout style; *stigma* included, discoid with a small annulus at its base. *Fruit* depressed-globular, obscurely 3-grooved, glabrous, the pericarp thickly coriaceous, 1.25 in. in diam. *Seeds* 2 or 3, elliptic.

South Andaman: King's Collector.

19. *DYSOXYLUM RUGULOSUM*, King n. sp. A tree 15 to 25 feet high:

young branches with striate pale brown bark. *Leaves* 8 to 12 in. long, equally pinnate, the petiole and rachis shorter than the uppermost pair of leaflets; leaflets 2 pairs, the upper pair much the larger, opposite, thickly membranous, pale and minutely rugulose when dry, oblong-oblongate, shortly and abruptly acuminate, the base much narrowed; main nerves 8 to 14 pairs, spreading or ascending, faint on the upper surface, prominent and almost winged on the lower: length of the lower pair 3·5 to 4·5 in., breadth about 1·5 in., length of the upper pair 6 to 8 in., breadth about 2·25 in.; petiolules about ·15 in., stout. *Racemes* supra-axillary, ·5 to ·75 in. long, 3- or 4-flowered, puberulous. *Flowers* ·2 in. long, their pedicels shorter. *Calyx* almost flat, 4-cornered, rugulose outside and puberulous, inside glabrous and reticulate. *Petals* 4, much longer than the calyx, elliptic, puberulous outside, glabrous inside, the apex sub-acute slightly thickened and inflexed, the base truncate. *Staminal tube* shorter than the petals, cylindric, slightly ridged and puberulous outside, glabrous inside, the mouth with 8 or 9 broad shallow emarginate teeth; *anthers* elliptic, not exserted. *Disc* shortly cylindric, slightly exceeding the ovary, fleshy, glabrous 8-or 9-toothed. *Ovary* hemispheric, ridged, puberulous, tapering into the long cylindric puberulous style; *stigma* exserted, discoid, with a broad annulus at its base. *Fruit* on a short stout pedicel, pyriform, apiculate, with numerous vertical rugae, puberulous, 1·25 in. long, and ·8 in. in diam. at the broadest part.

Perak: King's Collector, Nos. 2863, 3158, Scortechini.

This resembles *D. macrocarpum*, Bl. in its leaves, but its flowers are much smaller and are in short racemes, not in panicles.

20. *DYSOXYLUM PAPILLOSUM*, King n. sp. A shrub 6 to 8 feet high; young branches rather stout, densely tawny-tomentose. *Leaves* 12 to 18 in. long, equally pinnate, their petioles and rachises tomentose, more or less angled; leaflets 2 or 3 pairs, the upper pair the largest, opposite or sub-opposite, coriaceous, broadly oblanceolate, shortly acuminate, tapering from above the middle to the very narrow base; both surfaces when dry minutely papillose, many of the papillae and especially those on the upper surface with perforated apices; the upper surface glabrous, olivaceous green when dry; the lower yellowish-brown, the main nerves and midrib pubescent; main nerves 10 to 15 pairs, prominent on the lower, depressed on the upper surface when dry; length 6 to 12 in., breadth 2·25 to ·5 in., petiolules only ·15 in., stout, tomentose. *Spikes* extra-axillary, ·75 to 1·25 in. long, the rachis stout, woody, tomentose. *Flower-buds* globose, ·15 in. in diam., on very short thick pedicels. *Calyx* campanulate, enveloping the petals, 4-toothed, membranous, densely tomentose externally. *Petals* 4, fleshy, broadly

ovate, with truncate bases and sub-acute apices, concave, densely adpressed-pubescent outside, glabrous inside. *Staminal tube* much shorter than the petals, cylindric, rather fleshy, glabrous, the mouth with 8 broad shallow emarginate teeth: *anthers* 8, oblong, longer than the tube, much exerted. *Disc* (if any) very small. *Ovary* broadly ovoid, tapering into the short thick style which is sparsely pilose towards the base: *stigma* thick, discoid, depressed in the centre. *Fruit* unknown.

Perak: King's Collector, No. 10755.

The disc in this plant, if present at all, must be very small, for I cannot detect it in the bud. In spite of this I refer it to *Dysoxylum*, of which it has the general facies. The shrubby habit, short thick spicate inflorescence, globular flower-buds, and the occasionally perforated leaves make this a remarkable and easily recognisable plant.

6. AMOORA, Roxb.

Trees. *Leaves* usually unequally-pinnate; leaflets oblique, quite entire. Flowers in axillary subdioecious panicles, the females sometimes spicate or racemose. *Calyx* 3-5-partite or -fid. *Petals* 3, thick, concave, imbricated. *Staminal tube* sub-globose or campanulate, entire or inconspicuously 6-10-crenate; *anthers* 3-10, included. *Disc* obsolete. *Ovary* sessile, short, 3-celled; cells 1-2-ovuled, stigma sessile. *Capsule* sub-globose, coriaceous, 3-celled and -seeded, loculicidally 3-valved, or indehiscent. *Seeds* in a fleshy aril, with ventral hile.—DISTRIB. A genus of about 25 species occurring only in India and the Malay Archipelago, and also 1 endemic species in Australia.

The Indian species of *Amoora*, as this genus is understood by the most recent botanical writers, fall into two groups. One of these (the old genus *Aphanamixis*) is a very natural one. In this group the male flowers are in panicles with divergent racemose or spicate branches, while the female flowers are in short racemes. The flowers of both sexes have a 5-merous calyx, and a 3-merous corolla, 3 or 6 stamens, 3-celled ovaries and 3-celled loculicidally dehiscent capsular fruits. The other group, named *Pseudo-Aglaiia* by M. C. de Candolle, consists of a number of species with from 6 to 10 stamens, 3-celled-ovaries, and large stigmas. Some of these have 3 petals, others have 4 or 5. As regards fruit some of them (*e.g.*, *A. cucullata*) have a 3-celled capsule like that of *Aphanamixis*: others have fruits which show no evidence of dehiscence. In treating this genus, I have excluded all the species having more than 3 petals, and I have abandoned dehiscence in the fruit as a diagnostic character. In the note under the genus *Aglaiia*, I have explained the change which I have made in the staminal character of that genus. I may here add that *Amoora Chittagonga*, Hiern, is certainly an *Aglaiia*; and that *Amoora decandra* Hiern, with its 10 anthers in two rows, and 5-celled ovary and fruit, is more of a *Lansium* than an *Amoora*.

Section I. Male flowers in panicles, female flowers in short spikes or racemes, sepals 5, petals 3; fruit 3-celled, capsular, loculicidal.

Stamens 3 ... 1. *A. Sumatrana*.

Stamens 6 ...

Male flowers .15 in. long ... 2. *A. Rohituka*.

Male flowers .3 in. long ... 3. *A. Aphanamixis*.

Section II. Male and perfect female flowers mixed in the same panicles: calyx cupular, 3-toothed, petals 3, anthers 6 or 10; fruit 3-celled, but not in all cases dehiscent.

Stamens 6 ...

Leaflets cordate and slightly oblique at the base, minutely rusty-tomentose

beneath: flowers .25 in. long ... 4. *A. rubiginosa*.

Leaflets sub-cuneate at the base, minutely puberulous and lepidote beneath;

flowers less than .1 in. long ... 5. *A. lanceolata*.

Leaflets sub-falcate and very oblique at the base, everywhere glabrous; flowers

.15 in. long, obovoid ... 6. *A. cucullata*.

Leaflets caudate-acuminate, the base rounded or cuneate, oblique, everywhere glabrous: flowers .2 in. long, staminal tube cylindric ...

7. *A. Ridleyi*.

Stamens 10 ...

Panicles 12 to 20 in. long, cinereous-scurfy; leaflets with broad bases;

flowers .15 in. long ... 8. *A. Wallichii*.

Panicles 8 to 10 in. long, rusty-puberulous; leaflets narrowed at the base;

flowers .1 in. long ... 9. *A. rubescens*.

1. AMOORA SUMATRANA, Miq. in Ann. Mus. Lugd. Bat. IV, 35. A tree 12 to 20 feet high; young branches stout, lenticellate, glabrous. Leaves 20 to 30 in. long, glabrous, unequally pinnate; leaflets 9 to 13, elliptic to elliptic-oblong, or oblanceolate-oblong, sub-coriaceous, shortly cuspidate, entire, the base more or less cuneate: main nerves 9 to 20 pairs, spreading; length 3 to 10 in., breadth 1.5 to 3.75 in. Male flowers .15 in. long, obovoid, in solitary extra-axillary panicles nearly as long as the leaves, their branches 1.5 to 6 in. long, spreading or drooping: the flowers numerous but not crowded, each with a minute acuminate bracteole, the pedicels half as long as the flower, rather stout. Sepals 5, unequal, the two larger nearly half as long as the petals, rotund, the edges erose-fimbriate, the inner surface glabrous, the outer pubescent.

Petals 3, thick, rotund, very concave and much imbricate, glabrous inside, sometimes puberulous outside. *Staminal column* fleshy, globular-ovoid, obscurely 3-angled, the mouth almost closed; anthers 3, broadly elliptic, narrowed to the apex, shortly apiculate; rudimentary ovary minute, conical, on a small pubescent disc. *Female flowers* unknown; the fruit in simple spikes as long as or longer than the leaves, pinkish when ripe, shortly pedicellate, sub-globular, 3-celled, 3-seeded, dehiscent, about .75 in. in diam.; the *seeds* ovoid, compressed, with a scarlet arillus. C. DC. Monogr. Phaner. I., 581.

Perak: Scortechini, Wray, King's Collector. Penang: Curtis, King. Distrib. Sumatra.

This species resembles *A. Rohituka*, W. and A., but it is a smaller tree, the male flowers have only 3 stamens, and the petals are pink. The Perak specimens agree with those in the Leiden Herbarium from Sumatra on which Miquel founded the species. Miquel in his description does not mention that the plant is triandrous,—a character by which it can at once be recognised.

2. AMOORA ROHITUKA, W. and A. Prod. 119. A tree from 30 to 70 feet high; young branches stout, lenticellate, at first puberulous, afterwards glabrous. *Leaves* 1 to 3 feet long, unequally pinnate, the petioles puberulous; leaflets 9 to 15, sub-coriaceous, opposite, oblong to elliptic-oblong, shortly and bluntly acuminate, entire; the base narrowed, often oblique; both surfaces glabrous: main nerves 12 to 15 pairs, spreading; length 3 to 9 in., breadth 1.75 to 3.5 in., petiolule .2 to .3 in. *Male flowers* about .15 in. long, sub-globular, in solitary axillary panicles more than half as long as the leaves, the branches about 3 in. long, spreading at right angles or slightly drooping; the flowers numerous, each with a minute scale-like bract, the pedicels short, stout. *Calyx* very short, spreading, with 5 or 6 small reniform sepals, pubescent. *Petals* 3, much larger than the calyx, orbicular, concave, glabrous or puberulous on the outer surface. *Staminal tube* nearly as long as the petals, sub-globular, with a small opening at the apex showing the slightly protruding apices of the anthers: *anthers* 6, sub-sessile, narrowly elliptic, attached to the tube near its base; rudimentary ovary ellipsoid, boldly 3-angled. *Female flowers* larger than the males, in axillary or slightly supra-axillary, solitary, often puberulous spikes much shorter than the leaves. *Sepals* sometimes more pubescent than in the male: petals as in the male, the anthers narrower. *Ovary* sub-globular or ellipsoid with a 3-lobed stigma: disc hypogynous, broadly conical, tawny-pubescent. *Fruit* sub-globular, yellow when ripe, 1 to 1.5 in. in diam.; the pericarp coriaceous, smooth, 3-celled, opening by 3 valves: *seed* oblong with a scarlet arillus. Hiern in Hook. fil. Fl.

Br. Ind. I, 559; C. DC. Monogr. Phan. I, 581; Kurz For. Flor. Burma I, 220; Trimen Flora Ceyl. I, 249; Bedd. Fl. Sylvat. t. 132; Brandis For. Fl. 69. *Andersonia Rohituka*, Roxb. Hort. Beng. 87; Fl. Ind. ii, 213. *Sphærosacme polystachya*, Wall. Cat. 1277. *Aglaia?* *polystachya*, Wall. in Roxb. Fl. Ind. ed. Carey, ii. 429. *S. spicata*, Wall. Cat. 4895. *Buchanania spicata*, Hb. Roxb. ex Wall. l. c. *Meliacea Wightiana* Wall. Cat. 4888. *Amoora macrophylla*, Nimmo in Grah. Cat. Bomb. Pl. 31. *Andersonia Rohitoca*, Griff. Notul. iv. 507; Ic. Pl. Asiat. iv. t. 589, f. 3.

Perak: not uncommon. Malacca; Griffith (Kew Distrib.) 1051; Maingay (Kew Distrib.) 341; King's Collector, many numbers. Andamans; King's Collector. Distrib. Sumatra; Forbes, No. 1734.

3. AMOORA APHANAMIXIS, Schultes fil. Syst. VII, 1621, Phan. I, 581. A tree 20 to 30 feet high; young branches rusty puberulous, ultimately glabrous and (when dry) black. Leaves 15 to 25 in. long, unequally pinnate; leaflets 11 to 17, sub-coriaceous, oblong, oblong-obovate to elliptic, shortly and obtusely cuspidate; the base rounded, very unequal-sided; glabrous when adult; main nerves 10 to 12 pairs, slightly prominent beneath; length 4 to 6 or even 8 in., breadth 2 to 2.75 in.; petiolules stout, .15 to .25 in. long. Panicles slightly supra-axillary, shorter than the leaves, puberulous, those with male flowers with numerous short divaricating rather distantly-flowered racemose branches. Flowers on very short pedicels, sub-globose, about .25 in. in diam. Calyx cupular, with 5 rounded imbricate sepals, thickened in the lower half and puberulous outside. Petals 3, thick, rotund, concave, much larger than the sepals, glabrous. Staminal tube shorter than the petals, fleshy, glabrous, ovoid, with a small entire mouth; anthers 6, elliptic, included. Ovary depressed, 3-celled, glabrous; stigma elongate, conical, fluted. Female flowers in rigid, unbranched or only slightly branched racemes, sessile like the males but with larger ovaries. Fruit ovoid-globose (ripe example not seen), glabrous. Miq. Fl. Ind. Bat. I, pt. 2. p. 535: Ann. Mus. Lugd. Bat. IV, 34. *Amoora grandifolia*, C. DC. Monogr. Phan. I, 581. *Aphanamixis grandifolia*, Bl. Bijdr. 165.

Under cultivation the leaves of this species often attain much greater size than the measurements given above.

4. AMOORA RUBIGINOSA, Hiern in Hook. fil. Fl. Br. Ind. I, 561. A tree 80 to 100 feet high; young branches stout, rusty-puberulous and scurfy. Leaves 18 to 24 in. long, equally pinnate; leaflets 8 to 10 pairs, opposite or alternate, coriaceous, oblong or elliptic-oblong, sub-acute or shortly acuminate, the base cordate and slightly oblique; upper surface glabrous, shining, the lower densely covered by minute rusty

tomentum with a few superficial stellate hairs; main nerves 20 to 24 pairs, spreading, prominent beneath; length 5 to 9 in., breadth 1·25 to 2·75 in.; petiolules about ·15 in. long, bent. *Panicles* solitary, axillary, more than half as long as the leaves, scurfily rusty-puberulous, the peduncles long, branches few with short racemose branchlets. *Flowers* on short pedicels, buds narrowly ovoid, ·25 in. long. *Calyx* shortly campanulate, rusty-tomentose outside, with 3 broad blunt spreading teeth. *Petals* 3, larger than the calyx, obovate-rotund, thick, glabrous. *Staminal tube* slightly shorter than the petals, narrowly ovoid, the mouth narrow and obscurely toothed; *anthers* 6, elliptic, included. *Ovary* broadly ovoid, depressed, 3-angled, tawny-pubescent, crowned by the glabrous ovoid, 6-angled stigma. *Fruit* sub-globose, apiculate, red when ripe, rusty-puberulous, 2 to 3 in. in diam., the pericarp pulpy. *Seeds* narrowly ellipsoid, about 1 in. long. C. DC. Monogr. Phan. I, 585. *Aphanamixis rubiginosa*, Griff. MSS.

Malacca, Griffith, No. 1050: Maingay, No. 340 (both of Kew Distrib.). Perak: King's Collector. Singapore, Ridley, No. 3790.

5. *AMOORA LANCEOLATA*, Hiern in Hook. fil. Fl. Br. Ind. I, 560. A tree; young shoots minutely rusty-puberulous. *Leaves* 6 to 10 in. long, unequally pinnate. *Leaflets* about 17, sub-coriaceous, opposite or nearly so, narrowly oblong-lanceolate, bluntly acuminate, entire, the base sub-cuneate; upper surface quite glabrous, the lower very minutely puberulous and lepidote; main nerves very faint, about 25 pairs, spreading; length 2 to 3 in., breadth ·6 to ·75 in., petiole ·2 in. *Panicles* of *male flowers* axillary, solitary, nearly as long as the leaves, the branches spreading, 1·25 to 2 in. long, many-flowered. *Male flowers* less than ·1 in. long, ovoid, on very short pubescent pedicels. *Calyx* cupular, with 3 shallow teeth, pubescent. *Corolla* much larger than the calyx; petals 3, concave, glabrous inside, puberulous outside. *Staminal tube* shorter than the *petals*, globular, glabrous, the mouth deeply 6-toothed; *anthers* 6, included, opposite the teeth, narrowly-elliptic; rudimentary. *Ovary* conical, 3-angled, puberulous. *Female flowers* and fruit unknown. C. DC. in Monogr. Phan. I, 584.

Malacca; Maingay (Kew Distrib.), No. 343.

6. *AMOORA CUCULLATA*, Roxb. Corom. Pl. III, 54, t. 258. A glabrous tree 30 to 40 feet high. *Leaves* 12 to 15 in. long, unequally pinnate; leaflets 5 to 9, thinly coriaceous, opposite, oblong-elliptic, sub-falcate, sub-acute, very oblique at the base: main nerves indistinct, numerous, spreading, the midrib strong; length 3 to 5 in., breadth 1·2 to 1·5 in., petiolule ·3 in. *Male panicles* about equal to the leaves, axillary, with lax, spreading, corymbiform, sparsely lepidote branches. *Flowers* ·15 in. long, obovoid. *Calyx* cupular, lepidote outside, with 3 broad blunt

teeth. *Petals* 3, longer than the calyx, glabrous, broadly elliptic, the apex blunt and concave. *Staminal tube* shorter than the petals, obovoid, its mouth with 6 shallow broad blunt erose teeth; *anthers* 6, elliptic, included, attached half-way up the tube; *rudimentary ovary* broadly ovoid, sub-truncate. *Female flowers* a little larger than the males, but in few-flowered supra-axillary racemes about 2 in. long; *Calyx*, corolla, staminal tube and anthers as in the male; ovary ovate, 3-angled, lepidote, 3-celled: stigma sessile, large, 3-lobed. *Fruit* depressed-globular, 2·5 in. in diam., dehiscing by 3 valves, the pericarp leathery. *Seeds* 3, rounded trigonous, with an orange-coloured arillus. Kurz For. Flora Burma I, 221; C. DC. Monogr. Phan. I, 583; Hiern in Hook. fil. Fl. Br. Ind. I, 560: Bedd. Fl. Sylv. 55; Miq. Ann. Mus. Lugd. Bat. IV, 37; Dalz. and Gibs. Fl. Bomb. 37. *Andersonia cucullata*, Roxb. Hort. Beng. 82; Fl. Ind. II, 212. *Sphaerosacme Rohituka*, Wall. Cat. 1278. *Amoora auriculata*, Miq. MSS.

Perak: Scortechini. Singapore: Ridley. Distrib. Borneo, Korthals: Burma, Khasia Hills, Delta of Ganges, Nepal.

7. *AMOORA RIDLEYI*, King n. sp. A tree 50 to 60 feet high; young branches stout, minutely cinereous-puberulous. *Leaves* 18 to 24 in. long, unequally pinnate; leaflets 11 to 17, sub-opposite or opposite, sub-coriaceous, oblong-lanceolate to ovate-lanceolate, caudate-acuminate; the base rounded or cuneate, very unequal; both surfaces glabrous, the lower sub-glaucous; main nerves 8 to 13 pairs, spreading, slightly prominent on the lower surface: length 3·5 to 6 in., breadth 1·35 to 2 in., petiolules ·25 to ·4 in. *Panicles* axillary, solitary, about half as long as the leaves, stellate-pubescent, on long peduncles, much branched, the ultimate branchlets cymulose. *Flowers* ·2 in. long, narrowly ovoid, on bracteolate pedicels nearly as long as themselves. *Calyx* rather deeply cupular, tomentose outside, the mouth with 3 shallow broad teeth. *Petals* 3, longer than the calyx, fleshy, broadly elliptic, with very concave blunt apices, pubescent in the lower half outside, otherwise glabrous. *Staminal tube* much shorter than the *petals*, glabrous outside, with a few scattered hairs inside, cylindric, with a wide mouth with 6 broad shallow teeth; *anthers* 6, narrowly elliptic, their apices exserted; *ovary* depressed, densely pubescent, 3-celled; *stigma* glabrous, large, pyramidal, deeply grooved. *Fruit* globular, minutely rusty-tomentose, 2·5 in. in diam. when ripe, indehiscent, usually with 2 seeds 1·75 in. in length; peduncle, stout, ·5 in. long.

Perak: King's Collector, Nos. 5383, 5918, 6060, 7917; Wray, No. 2107. Pahang: Ridley, No. 5027.

8. *AMOORA WALLICHII*, King. A tree: young branches stout, minutely rusty-puberulous. *Leaves* 15 to 24 in. long, unequally pinnate:

leaflets 11 to 13, sub-coriaceous, opposite or sub-opposite, narrowly oblong, sub-acute, the base rounded or slightly cuneate, slightly oblique; both surfaces glabrous: main nerves 16 to 18 pairs, prominent on the rather pale under surface: length 4·5 to 8 in., breadth 1·4 to 2 in., petiolule ·5 in. *Panicles* solitary, axillary, nearly as long as the leaves, with few rather distant lax alternate branches, the ultimate branchlets cymulose and slightly scurfy. *Flowers* ·15 in. long, sub-rotund. *Calyx* a flat-tish cup with 3 broad shallow teeth, minutely tomentose externally. *Petals* 3, longer than the calyx, rotund, concave, much imbricate, minutely pubescent outside. *Staminal tube* spherical-obovoid, with 10 small acute teeth, glabrous; anthers 10, narrowly elliptic, their apices slightly exserted: rudimentary ovary depressed, tawny-pubescent, crowned by the thick fleshy 3-grooved stigma. *Female flowers* mixed with the males and exactly like them, but with a pyramidal, prominently 3-angled, tawny-pubescent, 3-celled ovary crowned by a stigma as in the male. *Fruit* obovoid, about 2 in. in diam., on a stout peduncle, its surface tawny-tomentose. *Sphaerosacme spectabilis*, Wall. MSS. in Herb. Calc. *Amoora spectabilis* Hiern (not of Miquel) in Hook. fil. Fl. Br. Ind. I, 561. Kurz For. Flora Burma I, 221.

Andaman Islands, King's Collectors. Distrib. Burma, Assam, Sikkim.

There has been some confusion in dealing with this plant. The description above given is that of Wallich's own specimen (in flower) taken from a tree grown in the Bot. Gard., Calcutta, which had originally been brought from Goalpara in Assam. Fruiting specimens have in more recent years been collected in Assam by Mr. Gustav Mann, for many years Conservator of Forests in that province. Flowering specimens exactly agreeing with Wallich's have also been brought from the Andaman Islands. Miquel has described (Ann. Mus. Lugd. Bat. IV, 37) under the name *Amoora spectabilis*, a plant of which he says *Sphaerosacme spectabilis*, Wall. is the type. But Miquel's description does not fit Wallich's plant at all. Mr. Hiern, taking Miquel's name *A. spectabilis*, describes under it a plant from Burmah which is certainly not Miquel's plant: but which may be the same as *Sphaerosacme spectabilis*, Wall.

9. *AMOORA RUBESCENS*, Hiern in Hook. fil. Fl. Br. Ind. I, 561. A tree 30 to 40 feet high; young branches stout, rusty puberulous. *Leaves* 18 to 30 in. long: leaflets 13 to 15, opposite, thinly coriaceous, oblong, sub-acute or obtuse, narrowed and oblique at the base, both surfaces glabrous; main nerves 8 to 10 pairs, ascending, rather prominent beneath; length 4 to 5·5 in., breadth 1·75 to 2·25 in., petiolule ·5 in. *Panicles* solitary, axillary, 8 to 10 in. long, rusty puberulous, the

branches spreading, the ultimate branchlets 2- to 3-flowered. *Flowers* on short pedicels, obovoid-rotund, .1 in. long. *Calyx* cupular, puberulous outside, with 3 broad blunt teeth. *Petals* 3, longer than the calyx, rotund, concave, slightly puberulous on the back and edges. *Staminal tube* broadly ovoid, the mouth wide and with 9 broad bifid teeth; *anthers* 10, elliptic, their apices exserted. *Ovary* depressed, tawny-pubescent, 3-celled: stigma large, cylindric, glabrous, sulcate. *Fruit* depressed-globular, mammillate, 2 in. in diam., minutely rusty puberulous, 3-celled (one cell abortive), pericarp thickly coriaceous, almost fleshy. C. DC. Monog. Phan. I, 589.

Singapore: Maingay Herb. prop. No. 3351 (Kew Distrib. No. 355). Perak: King's Collector, No. 5944; Wray, No. 2349. Penang: Curtis No. 2437.

The fruit when ripe is reddish-brown, according to Mr. Curtis.

7. *AGLAIA*, Lour.

Trees or shrubs, glabrous, lepidote or stellately pubescent. *Leaves* pinnate or trifoliolate; leaflets quite entire. *Flowers* polygamo-diœcious, minute or small, numerous, paniculate, sub-globose. *Calyx* 5-lobed, imbricated in bud. *Petals* 5, concave, short, imbricated. *Staminal tube* urceolate or sub-globose, 5-toothed at the apex or entire; anthers usually 5, or 4 or 10, included or half-exserted, erect. *Disk* inconspicuous. *Ovary* ovoid or shortly so, 1-3-celled, with 2-1 ovules in each cell; style glabrous, short. *Berry* dry, 1-2-celled and-seeded. *Seeds* with a fleshy integument.—DISTRIB. Species about 70, Chinese, Indo-Malayan or Polynesian.

The genus *Aglaiia* is distinguished by its small flowers with 5-merous calyx and corolla, and depressed-globose or globose staminal tube. The calyx-lobes are often imbricate, and the petals are invariably so, three being outside or partly so, and two entirely covered by the outer three. To the genus, as limited by M. C. de Candolle and Mr. Hiern, only species of which the anthers are either 5 or 6 can be admitted. The effect of this limitation as to the number of the anthers is to force into *Amoora* various species which, taking the section *Aphanamixis* as the type of *Amoora*, have far less in common with that genus than with the 5-antherous species of *Aglaiia*. The result, as regards *Amoora*, is that that genus is loaded with a number of anomalous species collected together in a group under the sectional name *Pseudo-Aglaiia*. By relaxing the definition of *Aglaiia* so as to admit plants of which the flowers have 4, 8 or 10 stamens, and by limiting *Amoora* to plants with 3-merous corollas, it appears to me that both genera are greatly simplified. Dehiscence in the fruit cannot be regarded as a diagnostic character of *Amoora*, there being several Indian species in the fruit of which there is no evidence of dehiscence; but indehiscence in the fruit is an absolute character in *Aglaiia*. The effect of the change which I have ventured to carry into effect in the diagnoses of these two genera is, as regards the species described by Mr. Hiern in the *Flora of British*

India, to convert *Amoora Maingayi* Hiern into an *Aglaia*: *Amoora dysoxyloides*, Kurz is also removed to this genus.

STAMENS 4 1. *A. fusca*.

STAMENS 5

Leaves quite glabrous, and not lepidote on the lower surface.

Leaves trifoliolate, 2·5 to 3 in. long, often shorter than the panicles; calyx with elliptic lobes: anthers elliptic, included... 2. *A. odorata*.

Leaves 3- to 5-foliolate, 5 to 9 in. long, always longer than the panicles; calyx with rounded teeth, puberulous outside; anthers broadly ovate and with the tips exserted... 3. *A. oligophylla*.

Leaves 5 to 8 in. long; leaflets 5 or more; all parts of the flower glabrous 4. *A. glabriflora*.

Leaves 7 or 8 in. long, leaflets 5 to 8, subglaucous beneath; sepals free, pubescent outside; flowers ovoid, ·1 in. long 5. *A. glaucescens*.

Leaves 6 to 12 in. long, leaflets 7 to 9, the calyx toothed, lepidote-pubescent outside; flowers depressed-hemispheric, ·05 in. in diam. ... 6. *A. Scortechinii*.

Leaves 12 to 24 in. long; leaflets about 15, brown when dry; calyx toothed, puberulous; flowers obovate, ·15 in. long 7. *A. Ganggo*.

Leaves 18 to 36 in. long; leaflets 11 to 13, pale when dry; calyx puberulous; flowers ·05 to ·075 in. in diam., depressed-globular ... 8. *A. leucophylla*.

Leaflets glabrous above, lepidote but not pubescent on the lower surface.

Flowers depressed-globular, not more than ·04 in. in diam., on pedicels as long as or longer than themselves.

Calyx with 4 or 5 long spreading unequal teeth nearly as long as the petals 9. *A. cinerea*.

Calyx with 5 orbicular blunt spreading lobes much shorter than the petals ... 10. *A. odoratissima*.

Flowers ovoid or obovoid-globose, ·05 in. or more in diam., on pedicels shorter than themselves.

Flowers ovoid, .08 in. long; calyx sub-campanulate, densely pubescent outside with 5 deep broadly ovate lobes; scales on under surface of leaflets minute and not shining ... 11. *A. Forbesii.*

Flowers ovoid, .05 in. long; calyx cupular, pale-coloured, almost glabrous, divided to the base into 5 shallow broad blunt lobes; scales on lower surface of leaflets shining ... 12. *A. squamulosa.*

Flowers obovoid-globose, .08 in. long; calyx with 5 broad shallow rounded spreading lobes minutely whitish tomentose with superficial stellate-hairy bright rusty scales; scales on lower surface of leaflets sparse stellate-hairy ... 13. *A. Kunstleri.*

Leaflets more or less glabrous on the upper, pubescent on the lower surface.

Panicles small with very short few-flowered branches ... 14. *A. humilis.*

Panicles condensed; flowers densely crowded, sessile.

Leaflets on the under surface covered with minute tomentum with stellate hairs intermixed, and with superficial shining scales; flowers sub-globular, petals orbicular ... 15. *A. argentea.*

Leaflets as in *A. argentea*, petals elliptic, flowers ovoid ... 15. *A. argentea.*
var. Curtisii.

Leaflets tomentose on the lower surface, scales if any not shining; petals elliptic, flowers ovoid ... 15. *A. argentea.*
var. eximia.

Panicles not condensed, their main branches spreading, the ultimate divisions short densely flowered spikes; flowers depressed-globular, sessile.

Flowers .1 in. in diam.,

Main nerves of leaves 28 to 36 pairs:

panicles 9 to 12 in. long ... 16. *A. lanuginosa.*

Main nerves of leaves 16 to 24 pairs;

panicles 6 to 8 in. long ... 17. *A. Curtisii.*

Flowers .025 to .4 in. in diam.

Calyx very tomentose and with 5 long narrow acute or sub-acute spreading unequal lobes some of them longer than the petals.

Leaves 4 to 9 in. long: leaflets not cordate at the base, 1.5 to 5 in. long; main nerves 6 to 11 pairs, spreading, fruit ellipsoid ... 18. *A. Palembangica.*

Leaves 7 to 15 in. long; leaflets minutely cordate at the base, 4 to 6 in. long; main nerves 10 to 14 in., oblique: fruit globular or ovoid ... 19. *A. cordata.*

Calyx much shorter than the petals and with broad short imbricate lobes.

Calyx quite glabrous ... 20. *A. Hiernii.*

Calyx pubescent outside; fruit pyri-form, 1.75 in. long ... 21. *A. Griffithii.*

Panicles lax, spreading; flowers not crowded, depressed-globular, globular or obovoid, sub-sessile or pedicelled.

Flowers sub-sessile, anthers exserted.

Flowers .035 in. in diam., depressed-globular, sub-sessile: calyx rotate and with 5 deep broad rounded membranous pubescent lobes: staminal tube short, cupular, sub-entire, glabrous. Fruit ovoid-globose, tapering into a pseudo-stalk, 1 in. long ... 22. *A. membranifolia.*

Flowers pedicelled, anthers included.

Flowers .05 in. long, globular, on pedicels longer than themselves. Calyx cupular with 5 acute spreading teeth stellate-pubescent outside. Staminal tube globular, inflated about the middle, glabrous, the mouth sub-entire: fruit obovoid, rugulose, about .4 in. long ... 23. *A. tenuicaulis.*

Flowers .06 in. long, obovoid, on pedicels shorter than themselves; Calyx cupular, pubescent outside, with 5 blunt rotund spreading lobes; staminal

tube obovoid, 5-toothed, puberulous;

fruit globular to ovoid, .4 to .6 in.

long 24. *A. trichostemon*.

STAMENS 7 TO 9.

Panicles 12 in. long : calyx with 4 broad

valvate unequal teeth ; stigma long, nar-

row, deeply 3-grooved, ovary 3-celled ... 25. *A. macrostigma*.

Panicles 2.5 to 6 in. long.

Calyx fleshy, pellucid-dotted, with 5

broad imbricate lobes : stigma thick,

cylindric, 2-lobed ; ovary 2-celled ... 26. *A. heteroclita*.

Calyx with 5 minute erect pointed teeth :

stigma capitate, 2- 3-angled ... 27. *A. andamanica*.

STAMENS 10 28. *A. Maingayi*.

1. *AGLAIA FUSCA*, n. sp. King. A tree, young branches cinereous, at first covered with a thin layer of deciduous minute pale rusty scurfy tomentum, afterwards glaberulous. *Leaves* 6 to 10 in. long, equally or unequally pinnate ; leaflets coriaceous, alternate, sub-opposite (the upper pair opposite) oblong-lanceolate to ovate-lanceolate, shortly acuminate or acute, the base cuneate or sometimes rounded ; upper surface glabrous and shining ; the lower glabrous, minutely punctulate, the midrib rusty-puberulous ; main nerves 7 to 9 pairs, ascending ; length 2.5 to 4.5 in., breadth 1 to 1.75 in. ; petiolules .35 in., that of the odd leaf (when present) longer. *Panicles* axillary, solitary, much shorter than the leaves, with rather long peduncles, the branches few, the flowers rather crowded. *Flowers* globular, .05 in. in diam., on pedicels rather shorter than themselves. *Calyx* of 4 unequal rotund sepals, scaly externally. *Petals* 4, rotund, concave, glabrous, larger than the sepals. *Staminal tube* globular-obovoid, much thickened inside below each anther, glabrous, the mouth small annular, sub-entire ; *anthers* 4, shortly and thickly ovate, inserted near the mouth. *Ovary* (rudimentary) pubescent ; *stigma* long, cylindric, glabrous. *Fruit* globular with a small apiculus, minutely rusty-tomentose, .3 in. in diam. (not ripe), one-celled and one-seeded by abortion.

South Andaman : King's Collector.

In the fruit distinct remains of a second cell are found. The species is closely allied to *A. fuscescens*, but is distinguishable by its thicker narrower leaflets with midribs hairy below, much smaller flowers, and more globose staminal tube which appears never to have more than 4 anthers. Flowers with perfect pistils have not yet been found.

2. *AGLAIA ODORATA*, Lour. Fl. Coch. Chin. 173. A shrub or small tree ; young shoots slender, rusty stellate-lepidote. *Leaves* trifoliolate, 2.5 to 5 in. long ; leaflets thinly coriaceous, ovate- or obovate-oblong, the

apex obtuse or tapered to each end or sub-rhomboidal: the terminal one the largest and tapering into the petiole: both surfaces glabrous, minutely reticulate when dry: main nerves 6 to 8 pairs, curving, indistinct; length of lateral pair 1·25 to 2 in., of terminal one 2·5 to 3·5 in. *Panicles* often longer than the leaves, lax. *Flowers* ·1 in. long, on pedicels of about the same length, glabrous. *Calyx* with 5 deep elliptic lobes. *Petals* unequal, orbicular or sub-orbicular. *Staminal tube* campanulate, with 5 broad truncate teeth; *anthers* 5, elliptic, included. *Fruit* unknown.

Malacca, Penang and Singapore; but probably only cultivated. Distrib. China and Siam.

3. *AGLAIA OLIGOPHYLLA*, Miq. Fl. Ind. Bat. Suppl. 507. A small tree 15 to 20 feet high: young branches covered with deciduous cinereous scurf. *Leaves* 5 to 9 in. long, unequally pinnate, the petioles and rachises puberulous, soon becoming glabrous; leaflets 3 to 5, membranous, the pairs opposite, the terminal one the largest, obovate-oblong to elliptic, shortly and often bluntly acuminate, the base cuneate, sometimes oblique: both surfaces glabrous, reticulate when dry; main nerves 5 or 6 pairs, ascending, curving; length 3 to 6 in., breadth 1·5 to 2·5 in.; petiolules ·4 to ·5 in., swollen at the base. *Panicles* axillary, 1·5 to 4 in. long, at first scurfy, but ultimately sub-glabrous, much branched, bracteolate. *Flowers* ·075 in., in diam., on slender pedicels as long as themselves, globular. *Calyx* cupular, flat, with 5 spreading rounded concave teeth, puberulous externally, the edges ciliolate. *Petals* much longer than the calyx, orbicular, concave, glabrous. *Staminal tube* shorter than the petals, globular-turbinate, 5-grooved, the mouth with 5 broad blunt teeth; *anthers* 5, broadly ovate, the tips only exerted. *Ovary* depressed; *stigma* conical, pubescent. *Fruit* globular, with the calyx persistent at its base, densely and minutely tawny-pubescent, ·5 or ·6 in. in diam.; the pedicels stout, glabrous ·1 in. long. Kurz For. Flora Burma I, 220; C. DC. Monogr. Phaner. I, 607; Miq. Ann. Mus. Lugd. Bat. IV, 41. *Meliaceae Singapuriana?* *Walsura* Wall. Cat. 4887.

Singapore: Wallich. Perak: King's Collector, No. 3968. Distrib. Burmah, Helfer (Kew Distrib.), No. 1046. Sumatra.

4. *AGLAIA GLABRIFLORA*, Hiern in Hook. fil. Fl. Br. Ind. 1. 555. A glabrous tree 15 to 25 feet high. *Leaves* 5 to 8 in. long, unequally pinnate, the petioles and rachises angled: leaflets about 8 opposite and one odd, membranous, usually ovate, rarely lanceolate, bluntly acuminate, the base cuneate, rarely rounded; when dry the upper surface shining, the lower dull; main nerves 4 pairs, ascending, curving, obsolete on the upper, slightly prominent on the lower surface; length 2 to 2·75 in., breadth ·75 to 1·25 in., petiolules ·15 to ·2 in. *Panicles* solitary, axillary, spreading, 1·5 to 4 in. long. *Flowers* numerous, ·1 in. long, their

pedicels usually shorter but sometimes longer than themselves. *Calyx* cupular, fleshy, with 5 broad shallow rounded teeth. *Petals* 5, much longer than the calyx, ovate, concave, the edges thin. *Staminal tube* shorter than the petals, urceolate, the edge sub-entire; *anthers* 5, elliptic, subcordate, deeply included. *Ovary* short, depressed, pubescent; *stigma* long, cylindric, glabrous. *Fruit* reniform, compressed, cinerous, puberulous, 2-celled, 2-seeded, .6 in. in diam. C. DC. Monogr. Phaner. I, 608.

Malacca: Griffith, Nos. 1041, 1042. Maingay (Kew Distrib.) No. 336. Perak: King's Collector, Nos. 10617, 10724. Scortechini, No. 482. Singapore: Ridley, Nos. 1812, 3898.

5. *AGLAIA GLAUDESCENS*, n. sp. King. A shrub: young branches rather slender, the bark when dry cinereous lenticellate; while young covered with pale rusty minute scurfy tomentum. *Leaves* 7 or 8 in. long, equally or unequally pinnate: leaflets 5 to 8, thinly coriaceous, oblong or elliptic-oblong or obovate-oblong, sub-acute, the base cuneate, both surfaces glabrous, the upper shining, the lower dull and sub-glaucous; main nerves 8 to 10 pairs, ascending, rather straight, slightly prominent on the lower surface; length 3.5 to 5.5 in., breadth 1.75 to 2 in. (rarely 3 in.), petiolules .35 to .5 in. *Panicles* solitary, axillary, nearly as long as the leaves, branching from near the base, very lax, few-flowered. *Flowers* ovoid, .1 in., long, on pedicels about as long as themselves. *Calyx* of 4 or 5 ovate concave ascending sepals, pubescent externally. *Petals* 4 or 5, larger than the sepals, thick, elliptic, obtuse, glabrous. *Staminal tube* nearly as long as the petals, cylindric, widening at the sub-entire mouth; *anthers* 4 or 5, shortly and broadly ovate, attached near the apex of the tube, included. *Ovary* shortly and narrowly cylindric, pubescent, crowned by the glabrous cylindric stigma. *Fruit* unknown.

South Andaman Island: King's Collectors.

6. *AGLAIA SCORTECHINII*, King, n. sp. A tree; young shoots slender and, like the slender petioles, rachises, petiolules and inflorescences, with very minute brown scales. *Leaves* 6 to 12 in. long, unequally pinnate; leaflets 7 to 9, the pairs opposite, membranous, lanceolate or oblong-lanceolate, shortly acuminate, much cuneate at the base; both surfaces quite glabrous, pale brown when dry; the 7 to 10 pairs of main nerves indistinct; length 3.5 to 5 in. *Panicles* 7 to 9 in., the branches long, divaricating, lax. *Flowers* depressed-hemispheric, .05 in. in diam., on slender pedicels longer than themselves. *Calyx* short, spreading, with 5 deep orbicular concave lobes, lepidote-pubescent externally. *Petals* 5, orbicular or ovate-orbicular, concave, glabrous, much larger than the calyx. *Staminal tube* shorter than the petals, widely depressed-campanulate, the mouth with several broad much inflexed teeth, glabrous;

anthers 5, elliptic, included. Ovary small, depressed; stigma globose. Fruit unknown.

Perak: Scortechini, No. 722.

The nearest ally of this is *A. speciosa*, Blume, which, however, has leaflets of thicker texture, with more numerous and distinct nerves and squamulose on the under surface. The flowers of the two also differ slightly, those of *A. speciosa*, although similar in calyx and corolla, having a staminal tube with a wide open mouth, without inflexed teeth and from which the anthers are partly exerted.

7. *AGLAIA GANGGO*, Miq. Flor. Ind. Bat. Suppl. 506. A tree: young branches, petioles, midribs and inflorescences covered with minute rusty scales. Leaves 10 to 24 in. long, equally or unequally pinnate; leaflets 10 to 15, opposite or alternate, sub-coriaceous, narrowly oblong or oblong-lanceolate, shortly and rather abruptly acuminate; the base cuneate, unequal-sided: both surfaces free from hairs, but covered with very minute scale-like pustules: main nerves 12 to 18 pairs, faint, spreading: length 3 to 5.5 in., breadth 1 to 1.75 in., petiolule .15 to .35 in. Panicles solitary, axillary, nearly as long as the leaves, the lower branches distant, all more or less spreading, the flowers on the ultimate branchlets rather crowded. Flowers .1 to .15 in. long, ovoid, sub-sessile. Calyx cupular, minutely pubescent and scaly outside, the mouth with 5 broad blunt erect teeth. Petals 5, larger than the calyx, elliptic, concave, blunt, glabrous. Staminal tube shorter than the petals, ovoid, the mouth small, circular, not toothed; anthers 5, narrowly elliptic, included. Ovary small, depressed, 3-angled, densely hairy, crowned by the glabrous cylindric grooved stigma. Fruits on short stout pedicels, reniform, compressed, 2-celled, 2-seeded, minutely rusty-lepidote, .5 in. broad (perhaps not quite ripe). Miq. Ann. Mus. Lugd. Bat. IV, 47. C. DC. Phaner. Monogr. I, 27.

South Andaman, Nicobar Islands; King's Collector. Distrib. Sumatra.

The flowers of the Andaman specimens agree exactly with those from Sumatra on which Miquel founded the species which is a very distinct one. On each panicle, there appear to be certain flowers with perfect and others with imperfect ovaries. The panicles bearing fruit are thus in size and ramification exactly like those bearing flowers. *A. Forsteni*, a species founded by Miquel (Ann. Mus. Lugd. Bat. IV, 46) on specimens collected in Amboina does not appear to me to be really distinct from this. Under the name of *Aglaia Ganggo*, Miq., I believe there have been issued from the Calcutta Herbarium some specimens of a Perak plant (King's Collector, No. 4606), which much resembles this in leaves and inflorescence, but which has a very different staminal tube.

8. *AGLAIA LEUCOPHYLLA*, King, n. sp. A tree 40 to 60 feet high; all parts quite glabrous; young branches rather stout, pale, cinereous when dry and slightly rough. *Leaves* 2 to 3 feet long, unequally pinnate; the petioles very long, minutely rugulose when dry; leaflets 11 to 13, membranous, the lower alternate and distant, the upper opposite, oblong-lanceolate to elliptic-oblong or ovate, all with acuminate apices and cuneate bases, the lower half sometimes very narrow; main nerves 9 to 15 pairs, spreading, curving, invisible on the upper but distinct on the lower surface; length 6 to 12 in., breadth 1·25 to 3 in.; petiolules ·25 to ·6 in., slender. *Panicles* extra-axillary, slender, rugulose, the branches spreading but slightly. *Flowers* ·05 to ·075 in. in diam., depressed-globular, on pedicels longer than themselves. *Calyx* much smaller than the petals, pale-coloured, puberulous, with 5 deep acute or sub-acute spreading lobes. *Petals* 5, dark-coloured when dry (yellow when fresh), orbicular, concave, glabrous. *Staminal tube* turbinate, the mouth 5- or 6-lobed; *anthers* 5 or 6, broadly ovate, the connective slightly apiculate at the apex, the apices bent downwards and not exerted. *Ovary* broad, depressed, pubescent: *stigma* broadly ovoid, the apex sub-2-lobed. *Fruit* (not ripe), obovoid, with depressed sub-bi-lobed apex; the slightly enlarged calyx persistent at the base, minutely cinereous, tomentose.

Perak: King's Collector, Nos. 1874, 2998 and 6494. Wray, No. 2935.

There is some diversity in the size of the leaflets and of the flowers of this species. My collector's gathering No. 2998 above-quoted has narrowly oblong-lanceolate leaflets, and its flowers measure scarcely ·05 in diam.: while the flowers of No. 1874 are quite ·075 in. in diam., and the leaflets of all the other gatherings, except No. 2998, are either elliptic-oblong or ovate. I find that the structure of the flowers is alike whatever their size may be.

9. *AGLAIA CINEREA*, King, n. sp. A shrub 10 to 15 feet high: young branches petioles, rachises, petiolules and inflorescences with numerous minute brown scales. *Leaves* 7 to 12 in. long, unequally pinnate: leaflets 5 to 7, alternate and rather distant; the uppermost pair opposite, thinly coriaceous, oblong- or ovate-lanceolate, often oblique, the apex shortly acuminate, the base cuneate, that of the upper three much narrowed in the lower third; both surfaces cinereous when dry, the lower paler and sparsely covered with rusty stellate scales; main nerves 8 to 13 pairs, oblique, rather straight; length 2·5 to 6 in., breadth 1 to 1·75 in.; petiolules ·35 to ·6 in., that of the odd leaflet sometimes ·8 in. *Panicles* supra-axillary, slender, lax, 5 to 7 in. long, the branches divaricating. *Flowers* small, ·04 in. in diam., globu-

lar, on slender pedicels longer than themselves. *Calyx* with 4 or 5 long spreading unequal blunt lobes nearly as long as the petals, pubescent-lepidote externally. *Petals* 5, concave, rotund, unequal, glabrous. *Staminal tube* shorter than the petals, shortly campanulate with a truncate entire mouth, glabrous: *anthers* 5, shortly ovate, exserted. *Ovary* and stigma both depressed. *Fruit* pyriform with a long pseudo-stalk and on a short stout pedicel, minutely pubescent-lepidote, .75 in. long, and .4 in. diam. near the apex.

Malacca: Griffith. Perak: King's Collector, Nos. 2730 and 5285. Scortechini No. 347.

10. *AGLAIA ODORATISSIMA*. Blume Bijdr. 171. A tree 20 to 40 feet high: young branches petioles rachises petiolules and inflorescences with minute brown deciduous scales. *Leaves* 5 to 9 in. long, unequally pinnate; leaflets 5 to 7, oblong-lanceolate, rarely ovate, opposite, thinly coriaceous, shortly acuminate, the base cuneate or rounded; upper surface glabrous, greenish when dry, the lower brown, sparsely (the midrib and nerves rather densely) lepidote; main nerves 6 to 9 (rarely 11) pairs, ascending, curved; length 2 to 5 (occasionally 7) in.,; breadth 1 to 2 (occasionally 2.5) in.; petiolules .2 in., that of the terminal one sometimes .3 in., *Panicles* supra-axillary, solitary, 3 to 8 in. long, (occasionally 10 to 12) in., the branches divaricating, densely-flowered. *Flowers* depressed-globular, about .035 in. in diam., on pedicels about as long. *Calyx* cupular, or rather flat, short, with 5 orbicular blunt spreading lobes, pubescent-lepidote outside. *Petals* 5, much longer than the calyx, elliptic or obovate-rotund, unequal, blunt, concave, glabrous, sometimes granular outside. *Staminal tube* shorter than the petals, truncate-campanulate, the mouth open, obscurely 5-lobed: *anthers* broadly ovoid, inserted by a very short filament just below the mouth of the tube, exserted, or inflexed and therefore included. *Ovary* small, depressed, pubescent; *stigma* small, broadly ovoid. *Fruit* ovoid or sub-globose, densely covered with minute brown scales, about .6 in. long, and .4 in. in diam., usually 1-seeded. Miq. Fl. Ind. Bat. Vol. I, pt. 2, p. 544; Ann. Mus. Lugd. Bat. IV. 44. C. DC. Monogr. Phaner. I, 602. *A. Roxburghiana* Hiern, Fl. Br. Ind. I, 555 and C. DC. Monogr. Phaner. I, 604. (not of Miquel.) *Aglaia*? Wall. Cat. 9039 ? *A. sexipetala*, Griff. Notulæ I, 505.

Malacca; Griffith 1036; Maingay (Kew Dist.), No. 337. Perak: Scortechini, Wray, King's Collector. Singapore: Ridley. Penang: Curtis Nos. 662, 768, 895, 896, 2448. Distrib. Sumatra, Java.

Although resembling *A. Roxburghiana*, Miq. in its calyx and corolla, that has a different staminal tube to which the strictly included more elliptic anthers are attached near the base, whereas the anthers of

this species are shortly and broadly triangular ovoid and are inserted on the staminal tube close to its mouth. The fruits too are different.

11. *AGLAIA FORBESII*, King, n. sp. A tree 40 to 80 feet high: young branches slender and, like the angled petioles rachises and petiolules, densely and minutely rufous-tomentose. *Leaves* 12 to 15 in. long, equally pinnate; leaflets 8 to 10, membranous, alternate, rather distant, oblong to elliptic, alternate (the upper pair usually opposite) cuspidate, the base slightly cuneate; upper surface olivaceous when dry, glabrous, minutely rugulose, dull; the lower rather pale brown, minutely scurfy: main nerves 10 to 13 pairs, oblique, rather straight, faint on the upper, bold on the lower surface: length 3·5 to 5·2 in., breadth 1·5 to 2·5 in. *Panicles* axillary, solitary, densely stellate-tomentose, 4·5 to 9 in. long, the branches spreading. *Flowers* numerous, ·08 in. long, ovoid, on pedicels shorter than themselves. *Calyx* sub-campanulate, densely pubescent outside, glabrous inside, with 5 deep broadly ovate lobes. *Petals* 5, twice as long as the calyx, orbicular or ovate-orbicular, concave, glabrous. *Staminal tube* shorter than the petals, turbinate-globular, the mouth with 5 broad shallow erose teeth, glabrous; *anthers* 5, ovate, included or with their apices exserted. *Ovary* small, depressed, puberulous; *stigma* large, fleshy, broadly ovoid. *Fruit* ellipsoid to ovoid, sometimes slightly gibbous at the base, or narrowly obovoid, not apiculate, pale yellow when ripe, covered with minute scurfy pubescence, 1 to 1·25 in. long, and ·7 to ·9 in. in diam. when dry; the pedicel short, stout.

Perak: Wray, No. 3265: King's Collector, Nos. 4762 and 10787. Pangkore: Curtis, No. 1631. Distrib. Sumatra, H. O. Forbes, No. 3179.

12. *AGLAIA SQUAMULOSA*, King, n. sp. A tree 30 to 50 feet high: young branches rather stout, the bark striate and densely covered with minute brown scurf-like pubescence. *Leaves* 15 to 30 in., unequally pinnate, petiole rachis and petiolules minutely squamulose-pubescent: leaflets 11 to 15, distant, alternate except the upper pair which are opposite, coriaceous; both surfaces minutely rugulose when dry, the upper glabrous and dull, the lower uniformly covered with shining minute pale-edged scales: main nerves 10 to 12 pairs, oblique, little curved, faint on the upper, bold on the lower surface: length 4 to 10 in., breadth 1·75 to 3·5 in., petiolules ·25 to ·6 in. *Panicles* axillary, solitary, much branched, spreading, squamulose, angled, many-flowered, 10 to 12 in. long. *Flowers* ovoid, ·05 in. long, on pedicels shorter than themselves. *Calyx* cupular, pale-coloured, almost glabrous, divided to the base into 5 shallow broad blunt lobes. *Petals* 5, much longer than the calyx, dark-coloured, rotund, unequal, concave, glabrous. *Staminal tube* shorter than the petals, globose, the mouth

entire: *anthers* 5, ovate, large. *Ovary* rather large, pubescent, extending much beyond the base of the ovoid glabrous stigma. *Fruit* (very young) narrowly elliptic, densely scaly like the under surface of the leaflets.

Perak: King's Collector, Nos. 8805, 11013, 10145.

In its leaves this resembles *A. latifolia* Miq., but the scales on the under surface of this are much larger and more shining. The flowers too of this are much smaller and the calyx and corolla differ.

13. *AGLAIA KUNSTLERI*, King, n. sp. A tree 30 to 40 feet high; young branches rather stout and, like the petioles, rachises, petiolules and inflorescences, covered with minute deciduous, brown pubescence and scales. *Leaves* 18 to 25 in. long, unequally pinnate; leaflets 5 to 13, coriaceous, oblong-ob lanceolate to elliptic-oblong, the apices shortly acuminate, the bases usually more or less oblique, rounded or cuneate, the upper leaflets often much narrowed in the lower third: upper surface glabrous, pale green, and minutely rugulose when dry, the lower paler, rugulose, and with sparse, stellate, hairy, minute brown scales: main nerves 10 to 14 pairs, faint on the upper, and only slightly prominent on the lower surface: length 4·5 to 7·5 in., breadth 1·75 to 2·75 in. *Panicles* solitary, axillary, branching, many-flowered, 3 to 9 in. long. *Flowers* .08 in. long, globular-obovoid, on pedicels shorter than themselves. *Calyx* cupular, tapering to the pedicel, with 5 broad blunt spreading shallow lobes, minutely whitish-tomentose with bright rusty superficial stellate-hairy scales. *Petals* 5, much larger than the calyx, broadly elliptic, concave, blunt. *Staminal tube* dark-coloured, pale and scarious towards the base, shorter than the petals, globose, glabrous, 5-lobed; *anthers* 5, broadly ovate, included. *Ovary* rusty-pubescent; *stigma* thick, short, conical. *Fruit* globular, slightly depressed at base and apex, densely covered with minute pale buff-coloured hairs, about .8 in. in diam. when dry, pedicel very short.

Perak: King's Collector, Nos. 5287, 10610.

14. *AGLAIA HUMILIS*, n. sp. King. A shrub or small tree; young branches stout, rusty puberulous, the bark dark-coloured. *Leaves* 18 to 26 in. long, unequally pinnate; *leaflets* sub-opposite (the upper pair opposite), thinly coriaceous, oblong to elliptic-oblong, rarely ovate, shortly cuspidate, the base rounded or sub-cuneate; both surfaces minutely punctulate when dry, the upper glabrous except the puberulous midrib; the lower glabrous, the midrib and nerves stellate-pubescent; main nerves 11 to 20 pairs, spreading, prominent on the lower, depressed on the upper surface when dry; length 4 to 9 in., breadth 1·75 to 3·5 in.; petiolules .25 to .6 in. *Panicles* supra-axillary, solitary, 3 to 6 in. long, with few-flowered very short branches. *Flowers* globular, .05 in. in

diam. *Calyx* campanulate, pubescent-lepidote outside, the mouth with 5 large rounded teeth. *Petals* 5, longer than the calyx, elliptic, glabrous. *Staminal tube* shorter than the petals, obovoid-globose, glabrous, the mouth with 5 shallow broad blunt teeth; anthers 5, ovate-ellipsoid, included, short. *Ovary* rather broad, pubescent, with a large glabrous conical 2-lobed stigma. *Fruit* (young) globular-obovoid, 2-celled; the pericarp fleshy, cinereous-pubescent externally.

Perak: King's Collector, No. 8619; Wray, No. 3763.

15. *AGLAIA ARGENTEA*, Blume Bijdr. 170. A slender tree 10 to 15 or 20 feet high; young shoots, petioles, rachises, petiolules, inflorescences and under surfaces of the leaves densely covered with a layer of minute tomentum with many stellate hairs and flat shining white or pale-brown scales intermixed and on the surface. *Leaves* 24 to 30 in. long, unequally pinnate; leaflets 7 to 11, alternate, the odd one and the upper pairs often much the largest, thinly coriaceous, oblong-lanceolate to ovate-lanceolate or elliptic, the odd leaflet and often also the upper pair often much cuneate at the base, the lower pairs often rounded, occasionally minutely cordate and sub-sessile, the apices of all more or less acuminate: upper surface glabrous, the lower shining silvery to pale brown; main nerves 12 to 24 pairs, inconspicuous on the upper bold and prominent on the lower surface; length of the lower leaflets 5 to 9 in., of the terminal one 12 to 15 in., breadth 2 to 5 in., petiolules .2 in. *Panicles* supra-axillary, pedunculate, spreading, very dense, 3 to 5 in. long. *Flowers* crowded, numerous, sessile, sub-globular, .08 in. in diam., *Calyx* half as long as the corolla, deeply divided into 5 broad rounded imbricate concave lobes, furfuraceous-lepidote externally, glabrous internally. *Petals* 5, concave, orbicular, glabrous. *Staminal tube* globular, shorter than the petals, the mouth sub-entire; *anthers* 5, ovate, included. *Ovary* depressed; *stigma* sub-cylindric, truncate, glabrous. *Fruit* ovoid or obovoid, minutely rusty-pubescent and lepidote, .8 to 1.25 in. long, Miq. Flor. Ind. Bat. Vol. 1, Pt. 2, 543; Ann. Mus. Lugd. Bat. IV, 54; Kurz For. Flor. Burma I, 219; C. DC. Monogr. Phaner. I, 618. *A. hypoleuca*, Miq. Ind. Bat. Suppl. 507. *A. speciosa*, Teysm. and Binn. Cat. Hort. Bogor. 211 (not of Blume). *Milnea argentea*, Reinw. in Cat. Hort. Bogor. 71.

Perak: King's Collector, No. 3135. Nicobar Islands, Kurz.—Distrib. Burma, Sumatra, Java, New Guinea.

This is a widely distributed and variable species of which Miquel (Ann. Mus. Lugd. Bat. IV, 55) enumerates no less than seven varieties, most of which he had himself previously treated as species. In young shoots the leaflets are often few but very large.

Var. *eximia*, Miq. Ann. Mus. Lugd. Bat. IV, 55. *Flowers* ovoid;

petals elliptic, staminal tube ovoid; leaflets 15 to 25, oblong, opposite, sub-sessile, the bases rounded, 3 to 6 in. long, the terminal one not longer than the pairs but with a narrow base: under-surfaces from pale to cinnamoneous, not shining. *A. eximia*, Miq. Fl. Ind. Bat. Suppl. 506. *A. ancolana* Miq. l. c. 506.

Perak: King's Collector, Nos. 5767 and 10007. Distrib. Sumatra.

Var. *Curtisii*, King. *Flowers* ovoid, .15 in. long: *petals* elliptic; *staminal tube* globular, the apical aperture very small and almost entire. *Leaflets* 15 to 19, oblong, shortly acuminate and with rounded bases, the terminal one not larger than the others. *Fruit* narrowly pyriform, densely lepidote.

Penang; Curtis, No. 2287. Perak: King's Collector, No. 8239.

16. *AGLAIA LANUGINOSA*, King, n. sp. A tree 50 to 70 feet high; young branches very stout (1 in. in diam.), rugulose and rusty-tomentose between the large triangular leaf-cicatrices. *Leaves* 2 to 4 feet long, unequally pinnate everywhere, except on the upper surfaces of the leaflets, densely covered with soft rusty stellate tomentum; leaflets 9 to 13, the pairs opposite, thinly coriaceous, oblong, cuspidate, the base rounded and often minutely cordate; upper surface glabrous; main nerves 28 to 36 pairs, sub-horizontal, slightly prominent on the lower, faintly depressed on the upper surface; length 5 to 15 in., breadth 2 to 3.5 in., petiolules .25 to .4 in. *Panicles* axillary, from 9 to 12 in. long, stout; branches few, ascending and bearing short lateral spikes. *Flowers* sessile, densely crowded, depressed-globular, about .1 in. in diam. *Calyx* completely enveloping the petals, with 5 deep narrow lobes covered outside with soft stellate wool, inside glabrous. *Petals* 5, elliptic, blunt, glabrous, concave, slightly shorter than the calyx. *Staminal tube* shorter than the petals, its mouth wide and deeply 5-lobed, glabrous; *anthers* opposite its lobes, large, included. *Ovary* small; *stigma* cylindric. *Fruit* unknown.

Perak: Scortechini, No. 1682; King's Collector, Nos. 7381, 7714.

This species resembles the Bornean *A. grandis*, Miq. in its leaves, but has different flowers. *Fruit* of both species is unknown.

17. *AGLAIA CURTISII*, King, n. sp. A tree 60 to 80 feet high; young branches stout, rusty puberulous. *Leaves* 18 to 30 in. long, unequally pinnate; leaflets coriaceous, 11 to 15, sub-opposite, oblong to elliptic, shortly acuminate; the bases of the lower rounded, of the upper cuneate; upper surface glaberulous and when dry minutely pustulate, the midrib puberulous; under surface covered with dense minute rusty tomentum with numerous stellate hairs on the surface; main nerves 16 to 24, spreading, prominent beneath; length 6 to 9 in., breadth 2 to 4 in., petiolules .2 to .35 in. *Panicles* slightly supra-axillary, solitary, 6

to 8 in. long, with few sub-erect branches; the branchlets short, densely flowered, all scurfy puberulous. *Flowers* globose, sessile, more than .1 in. in diam. *Calyx* of 4 or 5 thick densely tomentose sub-rotund sepals. *Petals* 5, glabrous. *Staminal tube* short, sub-globular, with a wide mouth; *anthers* 5, short, attached close to the mouth of the tube, their apices included. *Fruit* globular-obovoid, minutely rusty puberulous, 1.5 in. long, and 1.25 in. in diam.

Pangkore: Curtis, No. 1627. Perak; King's Collector, No. 7786.

A species allied to *A. pachyphylla*, Miq., and not easy by description alone to be distinguished from that species. An examination of Miquel's type specimen of *A. pachyphylla* kindly lent to me by the authorities of the Leiden Herbarium shows that the leaves of that are distinctly falcate, while those of this are not: moreover the leaves of *A. pachyphylla* taper much more to the apex, and the panicles are more robust, than is the case in this species. The tomentum on the under surface of the leaves differs in character in the two species; and in the leaves of *A. pachyphylla* the midribs of the leaves are raised and ridge-like on the upper surface, while these of this species are depressed. The fruit of *A. pachyphylla* is unknown.

18. *AGLAIA PALEMBANICA*, Miq. Flor. Ind. Bat., Suppl. 507. A tree 10 to 25 feet high; young shoots, petioles and rachises, petiolules and inflorescence densely rusty stellate-tomentose. *Leaves* 4 to 9 in. long, unequally pinnate; *leaflets* 5 to 9, sub-opposite, membranous, oblong-lanceolate to ovate, opposite or sub-opposite, shortly acuminate, the base cuneate, the terminal and upper pairs of leaflets with bases much narrowed; upper surface sometimes deciduously lepidote, ultimately glabrous, except sometimes the pubescent lower half of the midrib; lower surface more or less closely stellate-pubescent, especially on the midrib and 6 to 11 pairs of spreading main nerves; length 1.5 to 5 in., breadth .65 to 1.75 in., petiolules .15 in. *Panicles* solitary, axillary, 1.5 to 4 in. long, slender, their branches short and divaricating, bearing the flowers in dense short spikes. *Flowers* depressed-globular, about .025 in. in diam. *Calyx* with 5 long narrow acute or sub-acute spreading unequal lobes, some of them occasionally longer than the petals, boldly stellate-tomentose outside, glabrous inside. *Petals* 5, obovate-elliptic, concave, glabrous. *Staminal tube* shorter than the petals, glabrous, its mouth truncate entire; *anthers* 5, ovate, curved, half-exserted. *Ovary* large, pubescent, stigma 3-angled. *Fruit* ellipsoid (narrowly so when young), deciduously stellate-tomentose, .75 in. long, and .6 in. in diam. Miq. Ann. Mus. Lugd. Bat. IV., 52; Hiern in Hook. fil. Fl. Br. Ind. I, 557; C. DC. Monogr. Phaner. I, 619. *Aglaia Sipannas*, Miq. Fl. Ind. Bat. Suppl. 508. *A. tomentosa*, Teysm. and Binn. in Nat. Tijdschr. Ned.

Ind. Vol. 27. p. 43. *A. rufa*, Miq. in Ann. Mus. Lugd. Bat. IV, 649. C. DC. Monogr. Phaner. I, 613.

Malacca: Griffith, No. 1043. Maingay (Kew Distrib.), No. 333. Penang: Curtis, No. 2003; King's Collector, No. 1790. Perak: Scortechini, Wray, King's Collector. Kedah: Curtis, No. 2520. DISTRIBUTION: Sumatra, Bangka, Borneo.

This differs from its nearest ally *A. Griffithii* in its large, irregularly lobed, very tomentose calyx, and in its smaller fruit and leaves. I have examined authentic specimens of *A. Sipannas*, Miq. and of *A. rufa*, Miq., and I cannot see how they are to be separated from *A. palembanica*, Miq. A specimen in the Leiden Herbarium, collected by Korthals in Sumatra, and named in Miquel's handwriting *A. elliptica*, Blume, var. *Sumatra*, ought in my opinion to be referred to this species. The plant named by Teysmann and Binnindyk *A. tomentosa*, and of which Curtis's specimen from Kedah, No. 2520, is an example, has longer leaflets than typical *A. palembanica*, with more nerves, and more tomentose beneath; but I think its reduction to this is justifiable. This plant has a wider distribution than is usual with species of this family, and slight local differences are thus naturally to be expected.

19. *AGLAIA CORDATA*, Hiern in Hook. fil. Fl. Br. Ind. I, 557 (excl. var. 2). A tree 20 to 30 feet high; young shoots, petioles, rachises, petiolules and inflorescence more or less densely clothed with rusty or tawny stellate-tomentum. *Leaves* 7 to 15 in. long, unequally pinnate; leaflets 7 to 9, the pairs opposite, rarely sub-opposite, membranous, oblong-ob lanceolate, rarely ovate or elliptic, all with shortly acuminate apices, the odd one the largest and much attenuate towards the base, the paired leaflets cuneate, minutely cordate at the very base; upper surface glabrous, the midrib slightly pubescent; the lower stellate-pubescent, sometimes densely so, the midrib always, and the nerves usually, tomentose; main nerves 10 to 14 pairs, oblique, slightly depressed on the upper surface when dry and prominent on the lower: length 4 to 6 in., breadth 1.75 to 2.25 in., petiolules less than .1 in. or absent; the terminal leaflet larger and with a petiolule .2 to .4 in. long. *Panicles* axillary, solitary, 3 to 6 in. long, the branches spreading, the ultimate branchlets shorter, spike-like, and densely crowded with flowers. *Flowers* about .35 in. in diam., sub-sessile, otherwise as in those of *A. palembanica*. *Fruit* globular or ovoid, densely covered with deciduous rusty stellate tomentum, .5 to .65 in. in diam. C. DC. in Monogr. Phaner. I, 618 (excl. var. b. *calyce glabro*).

Malacca: Maingay (Kew Distrib.), Nos. 334, 335/2. Singapore: Ridley, No. 333. Perak: Scortechini; Wray, No. 2962; King's Collector, Nos. 2836, 3646, 5071, 6360.

Under his species *A. cordata*, Mr. Hiern has in my opinion included two plants. The species *A. cordata*, as here limited, includes only Hiern's form with hirsute calyx, and is really little more than a large-leaved variety of *A. palembanica*. Mr. Hiern's form with glabrous calyx is, in my opinion, a distinct species, the calyx differing not only in being glabrous, but in being much smaller, and of quite a different shape. I have described it as a species under the name *A. Hiernii*.

20. *AGLAIA HIERNII*, King, n. sp. A tree 40 to 80 feet high; young branches, petioles, rachises, petiolules and inflorescences, densely clothed with rather soft rusty stellate tomentum. *Leaves* 14 to 18 in. long, unequally pinnate; leaflets 7 to 9, the pairs opposite, thickly membranous, oblong or oblong-lanceolate; the terminal one oblong-oblancoate, longer than the others and two or three times as long as the petiolule; the apices of all shortly and sharply acuminate, the bases cuneate, especially of the uppermost ones; upper surface glabrescent with a few scattered stellate-hairs, the midrib and nerves densely stellate-pubescent; under-surface uniformly covered with pale-brown-centred scales and a superficial layer of rufous stellate tomentum; main nerves 13 to 22 pairs, sub-horizontal, depressed on the upper and bold on the lower surface when dry; length 4 to 6 in. (the odd one an inch longer); breadth 1.75 to 2.25 in., petiolules of the pairs .15 in. *Panicles* slightly supra-axillary, solitary, 8 to 12 in. long, the branches divaricating, the ultimate branchlets bearing densely-flowered spikes. *Flowers* .4 in. long, sessile, globular. *Calyx* cupular, quite glabrous, with 4 or 5 deep broad rounded imbricate lobes. *Petals* 5, rotund or ovate-rotund, unequal, much longer than the calyx, the outer 3 the largest, all concave and glabrous. *Staminal tube* shorter than the petals, cup-shaped, the mouth wide; the 5 ovate *anthers* inserted by very short filaments on the edge of the tube, but inflexed so as to be included. *Ovary* small, pubescent; *stigma* depressed-spheroidal, pubescent. *Fruit* unknown.

Malacca: Maingay. Perak: King's Collector, Nos. 5976, 6706, 10877.

This is allied to *A. cordata*, Hiern, but differs from it in having leaflets with more numerous and more horizontal main nerves, more densely tomentose and lepidote beneath. The calyx of this, moreover, is conspicuously different, being smaller, having broad lobes much shorter than the petals, and quite glabrous, while the calyx of *A. cordata*, as limited here, has a large calyx densely stellate-tomentose externally, and with acute lobes often longer than the petals. This is a large tree, often attaining a height of 80 feet, while *A. cordata* is a small tree from 20 to 30 feet high.

21. *AGLAIA GRIFFITHII*, Kurz in Journ. As. Soc. Bengal, for 1875, p. 146. A tree 30 to 50 feet high; young branches petioles, rachises, petiolules and inflorescences densely clothed with minute rusty stellate pubescence. *Leaves* 12 to 18 in. long, unequally pinnate; leaflets 13 to 19, opposite or sub-opposite, narrowly elliptic or oblong-lanceolate, often slightly oblanceolate, shortly acuminate, the base rounded or sub-cuneate: upper surface glabrous except the rusty tomentose midrib, the nerves inconspicuous; lower surface sparsely stellate-pubescent, the midrib and 10 to 12 pairs of bold curved spreading nerves tomentose; length 2·5 to 5 or even 6 in., breadth 1 to 1·4 in., petiolules about ·15 in. *Panicles* solitary, axillary, spreading, many-branched, many-flowered. *Flowers* about ·025 in. in diam., depressed-globular, broader than long. *Calyx* cupular with 5 deep broad lobes, pubescent outside. *Petals* 5, twice as long as the calyx, concave, glabrous. *Staminal tube* shorter than the petals, glabrous; *anthers* 5, ovate, partly exserted. *Ovary* pubescent; *stigma* depressed-hemispheric. *Fruit* pyriform, densely covered with sub-deciduous rusty scurfy stellate tomentum, 1·75 in long, and 1·25 in. in diam. Kurz For. Flora Burma I, 219. *A. minutiflora* Bedd. var. *Griffithii*, Hiern in Hook. fil. Fl. Br. Ind. I, 557: C. DC. in Phaner. Monogr. I, 616.

Malacca: Griffith, Nos. 1039 and 1040: Maingay, No. 334-2 (No. 334 is *A. cordata*, Hiern). Perak: Scortechini, Wray, King's Collector, Nos. 4231, 6282, 6341, 6346, 10285, 10925, 10957.

The flowers of this are less than half the size of those of *A. minutiflora* Bedd.—a plant of Western Peninsular India, of which Mr. Hiern and M. C. De Candolle make this a variety. On dissecting male flowers of an authentic specimen of Beddome's plant I find, however, that not only are the flowers larger, but they are of a different shape, being globular-obovoid, while those of this plant are depressed-globular and broader than long. The calyx of this, moreover, is about half as long as the petals, while the calyx of Beddome's plant is not more than a third or a fourth of the length of its petals. Moreover, the leaflets of *A. minutiflora* Bedd., are less numerous than in this plant, and the tomentum on their lower surface is much more dense. The fruit hitherto described as belonging to this plant, is that issued from Kew as No. 334 of Maingay's Herbarium. That fruit, however, does not belong to this species, but to *A. cordata*, Maing. It is globular and, in size as well as in shape, greatly resembles that of *A. minutiflora*. The true fruit of this (now described for the first time) is pyriform and much larger than that of *A. minutiflora*. On account of these differences, I therefore follow Kurz in regarding this as a distinct species from the latter.

22. *AGLAIA MEMBRANIFOLIA*, King, n. sp. A tree 20 to 60 feet high.

Leaves 2 to 3 feet long, the petioles, rachises and petiolules covered with minute harsh tomentum, unequally pinnate; leaflets from 7 to 11, thinly membranous, elliptic-oblong, acuminate, the base cuneate; upper surface glabrous, pale greenish when dry, the lower surface darker and sometimes with a tinge of purple, very sparsely and minutely stellate-pubescent, the midrib boldly so; main nerves 20 to 30 pairs, faint on the upper, bold on the lower surface; length 9 to 15 in., breadth 2·75 to 5·5 in., petiolules only about ·1 in. *Panicles* everywhere stellately rusty-pubescent, slightly supra-axillary, with numerous, many-flowered, spreading branches. *Flowers* about ·035 in. in diam., depressed-globular, almost sessile, often with a few bracteoles at the base. *Calyx* rotate, with 5 deep broad rounded membranous pubescent lobes. *Petals* 5, broadly ovate to rotund, longer than the calyx, glabrous, concave. *Staminal tube* shorter than the petals, cupular, sub-entire, glabrous; *anthers* 5, ovate, curved, exserted. *Ovary* small, much depressed; *stigma* depressed-spheroidal, vertically grooved. *Fruit* ovoid or ovoid-globose, tapering at the base into a short pseudo-stalk, densely covered with minute scaly tawny tomentum, 1 in. long, and ·75 in. in diam.

Perak: King's Collector, Nos. 5901 and 7104. DISTRIBUTION: Sumatra; Forbes, No. 1679.

This resembles *A. tenuicaulis*, Hiern; but it has smaller flowers, different calyx and staminal tube and larger fruit. The texture of the leaflets is also thinner and the stellate hairs on their under surface less numerous.

23. *AGLAIA TENUICAULIS*, Hiern in Hook. fl. Fl. Br. Ind. I, 556. A shrub or small tree 10 or 12 feet high with a slender stem 2 to 3 in. in diam. *Leaves* 3 feet or more in length, unequally pinnate; the long petiole, rachises, petiolules and young branches densely stellate rusty-tomentose; leaflets membranous, oblong to elliptic, minutely cuspidate to shortly acuminate; the base cuneate, rarely rounded; upper surface glabrous, the lower sparsely minutely stellately rufous-pubescent; main nerves 15 to 20 pairs, spreading, obsolete on the upper prominent on the lower surface; length 6 to 12 in., breadth 2·5 to 4·5 in.; petiolules ·3 to ·35 in., stout. *Panicles* slightly supra-axillary, everywhere densely rufous-pubescent like the petioles, about 12 in. long, with spreading densely-flowered branches, those bearing fruit only a few inches long. *Flowers* ·05 in. long, globular, on pedicels longer than themselves. *Calyx* cupular, stellate-pubescent outside, glabrous inside, with 5 deep acute spreading teeth. *Petals* 5, much longer than the calyx, ovate or sub-obovate, concave, elliptic, glabrous. *Staminal tube* shorter than the petals, globular, inflated about the middle of the sub-entire mouth, glabrous except at the base inside; *anthers* 5, short, ovate, included. *Ovary*

small, stellate-hairy. *Stigma* elliptic, obtuse. *Fruit* obovoid, rugulose, densely covered with minute rusty stellate-tomentum, about .4 in. long, C. DC. in Monogr. Phaner. I, 615.

Penang: Maingay (Kew Distrib.), No. 3252. Curtis, No. 747. Selangor; Ridley. Perak; Wray, King's Collector, Scortechini. Singapore; Lobb. DISTRIB. Sumatra.

24. *AGLAIA TRICHOSTEMON*, C. DC. Monogr. Phaner. I, 608. A tree 30 to 60 feet high; young shoots, petioles and rachises of leaves and inflorescences deciduously rusty stellate-tomentose, scabroid beneath the tomentum. *Leaves* 18 to 27 in. long, unequally pinnate; leaflets 9 to 13, alternate or opposite, sub-coriaceous, oblong to elliptic, shortly acuminate, the base slightly cuneate or rounded; upper surface glabrous, the lower sparsely and minutely stellately pubescent; main nerves 12 to 16 pairs, slightly depressed on the upper surface when dry, bold on the lower; length 4 to 8 in.; breadth 2 to 2.75 in.; petiolules .25 to .4 in. *Panicles* supra-axillary, solitary, nearly as long as the leaves, with few divaricating lax branches, densely and minutely rusty stellulate-pubescent and scaly. *Flowers* obovoid, globose, .06 in. long, on pubescent pedicels shorter than themselves. *Calyx* shallow, cupular, deeply divided into 5 rotund, blunt, spreading lobes, pubescent externally. *Petals* 5, slightly unequal, ovate-rotund, concave, glabrous, much longer than the calyx. *Staminal tube* shorter than the petals, thin, puberulous, obovate, the mouth with 5 broad emarginate shallow teeth; *anthers* 5, broadly ovate, small, inserted near the edge of the tube, included. *Disc* rather large, inferior to the ovary, pubescent. *Ovary* small, cylindric, 4-angled, glabrous. *Fruit* globular to ovoid, shortly pedicelled, densely covered with minute rusty stellate tomentum, .4 to .6 in. long. *Cupania rufescens*, Wall. Cat. 8067 B (exclude A). *Aglaia edulis*, Hiern in Hook. fil. Fl. Br. Ind. I, 1556. *Aglaia cupanioidea*, King MSS.

Penang; Wallich. Perak; Scortechini, King's Collector, Nos. 5597, 5901. Pahang; Ridley, No. 5885. Singapore, Anderson, No. 29; Ridley, No. 5833. Malacca; Derry, Nos. 1076, 1186. DISTRIBUTION Borneo, Beccari, No. 3981.

Although first collected so long ago as Wallich's time, fruit of this very distinct species is now described for the first time. It resembles *A. tenuicaulis* and *A. membranifolia* to some extent in its leaves, but is a much larger tree than either, and its leaflets have a thicker texture. Its fruits are much smaller than those of *A. membranifolia*; and, although of about the same size as those of *A. tenuicaulis*, they are covered with much shorter tomentum. Specimens of this were distributed from the Calcutta Herbarium under the MSS. name *Aglaia cupanioidea*, King MSS.

25. *AGLAIA MACROSTIGMA*, King, n. sp. A tree 40 to 60 feet high; young branches very stout, lenticellate, puberulous. *Leaves* 2·5 to 4 feet long, unequally pinnate, the petioles very long, ·3 in. thick, and, like the rachises petiolules and inflorescence, covered with minute brown scales; leaflets 15 to 17, the pairs opposite or nearly so, membranous, elliptic to elliptic-oblong, slightly oblique, shortly and sharply acuminate, the base rounded; upper surface everywhere glabrous, the lower glabrous, the midrib and nerves rugulose and minutely scaly: main nerves 12 to 20 pairs, depressed on the upper surface, very prominent on the lower; length 5 to 10 in., breadth 2 to 4 in., petiolules ·5 to ·7 in. *Panicles* axillary, solitary, about 12 in. long (including the long peduncle), the branches rather short, many-flowered. *Flowers* broadly obovoid, about ·08 in. long, on short stout rusty-tomentose pedicels. *Calyx* half as long as the corolla, cup-shaped, the mouth with 4 unequal broad valvate teeth, rusty-stellate-tomentose externally. *Petals* 5, glabrous, imbricate, the two external longer and orbicular, the 3 inner smaller and elliptic. *Staminal tube* shorter than the petals, cupular, the mouth wide and with 8 to 10 lanceolate teeth; *anthers* 7 or 8, large, elliptic, much exserted. *Ovary* depressed, 3 angled, 3-celled, yellowish-pubescent, crowned by a glabrous erect fleshy deeply-fluted 3-angled stigma. *Fruit* elliptic-obovoid, narrowed to a short pseudo-stalk, covered with minute pale scales, 1·5 in. long, and 1 in. in diam.

Perak: King's Collector, Nos. 6531, 6919, 7559.

Like *A. heteroclita*, King, this species has more than 5 stamens, and it has a larger stigma than is usually found in *Aglaia*. Its inflorescence is quite that of *Aglaia*, as also is its fruit.

26. *AGLAIA HETEROCLITA*, King, n. sp. A tree 30 to 40 feet high, glabrous except the inflorescence and under surfaces of the leaves. *Leaves* 18 to 30 in. long, equally or unequally pinnate: leaflets thinly coriaceous, 8 or 9 to 10 or 11, distant, alternate, oblong to elliptic-oblong, oblique, more or less acuminate, the base cuneate and oblique: both surfaces dull and pale when dry (especially the lower), the upper glabrous, the lower with sparse minute rusty stellate scales; main nerves 12 to 16 pairs, spreading, faint on the upper, and only slightly conspicuous on the lower surface; length 4 to 7 in., breadth 1·5 to 2·75 in.; petiolules ·35 to ·75 in., slender. *Panicles* axillary or terminal, 2·5 to 6 in. long, stout, the branches not divaricating, the ultimate branchlets minutely bracteolate, densely flowered. *Flowers* ·125 in. long, sub-globular, on thick pedicels shorter than themselves and with a spongy epidermis. *Calyx* fleshy, corrugated, conspicuously pellucid-dotted, deeply divided into 5 broad rounded imbricated concave lobes. *Petals* 5, somewhat longer than the calyx and thinner, not dotted, ellip-

tic, blunt, concave especially towards the apex. *Staminal tube* shorter than the petals and darker in colour, globular-cylindric, the mouth obscurely lobed. *Anthers* 7 or 8, elliptic, included. *Ovary* pyramidal, fleshy, grooved, pubescent, 2-celled, crowned by the glabrous, broadly and shortly cylindric, grooved, indistinctly 2-lobed stigma. *Ovules* 2 in each cell, superposed. *Fruit* obovoid or pyriform, shortly apiculate, minutely scaly-tomentose, about 1 in. long including the pseudo-stalk, and .8 in. in diam., apparently indehiscent, 1- or 2-seeded.

Perak; King's Collector, No. 10896, Wray (at elevation of 3400 ft.), Nos. 1135, 3994. **DISTRIB.** Sumatra, Forbes, Nos. 1558 and 1696.

This differs from typical *Aglaia* in having 7 or 8 stamens, and its stigma is that of *Amoora* rather than of *Aglaia*. The inflorescence resembles that of *Aglaia argentea*, Bl.

27. *AGLAIA ANDAMANICA*, Hiern in Hook. fil. Fl. Br. Ind. I, 218. A tree 30 to 40 feet high; young branches, petioles, midribs, inflorescence and calyx covered with pale-brownish deciduous scales. *Leaves* 12 to 15 in. long, unequally pinnate; leaflets 5 to 7, alternate, membranous, ovate-elliptic to elliptic, shortly and obtusely acuminate, the base rounded or sub-cuneate, slightly oblique; main nerves 13 to 15 pairs, faint; upper surface glabrous, shining; the lower dull, sparsely scaly; main nerves 13 to 16 pairs, oblique, slightly prominent below; length 4 to 6 in., breadth 2 to 3 in., petiolule .25 to .35 in. *Panicles* crowded towards the ends of the branches, axillary, solitary, 2 to 3 in. long, many-flowered. *Flowers* broadly ovoid, truncate, .15 in. long, on pedicels shorter than themselves. *Calyx* cupular, puberulous and scaly outside, the mouth with 5 pointed minute erect teeth. *Petals* 5, larger than the calyx, elliptic, slightly obovate, the apex blunt and incurved, puberulous externally, the edges membranous and glabrous. *Staminal tube* ovoid-globose, the apex sub-truncate, with 4 obscure broad teeth; *anthers* 8 or 9, narrowly elliptic, sessile, inserted at the base of the tube, included. *Ovary* small, depressed, 3-angled, densely tawny-tomentose; *stigma* sub-capitate, glabrous, fleshy, 2-3-angled. *Fruit* narrowly ellipsoid, lepidote, 1.5 in. long. Kurz For. Flora Burma. I, 218. C. DC. Monogr. Phaner. I, 606. *Amoora dysoxyloides*, Kurz Journ. As. Soc. Bengal II, 1875, p. 200; I, 222. C. DC. l. c. I, 589.

The Andaman and Nicobar Islands; Kurz, King's Collectors. **DISTRIB.** Great Coco Island, Prain. Burma, Brandis.

Kurz described his *Amoora dysoxyloides* on scanty specimens collected by Sir Dietrich Brandis in Burma. I have carefully dissected flowers from these and I find they are those of an *Aglaia*, and belong to *A. andamanica*, Hiern.

28. *AGLAIA MAINGAYI*, King, n. sp. A shrub? young branches, thin,

with pale bark and minute brown scales. *Leaves* 4 to 6 in. long; *leaflets* 4 or 5, alternate or opposite, membranous, oblong-elliptic, shortly and bluntly acuminate, the base cuneate, both surfaces glabrous; main nerves 6 to 9 pairs, ascending, faint; length 2·5 to 3·5 in.; breadth 1·15 to 1·5 in., petiolule ·25 in. *Panicles* one or two from an axil, shorter than the leaves, slender, much branched, scaly. *Flowers* on pedicels as long as themselves, depressed-globular, ·15 in. in diam. *Calyx* widely cupular, pubescent and scaly outside, with 4 or 5 broad shallow erect unequal teeth. *Petals* 4 or 5, larger than the calyx, obovate, the upper half concave, glabrous or puberulous, attached by their bases to the staminal tube. *Staminal tube* depressed-globose, the mouth wide and obscurely toothed, puberulous below the anthers inside; *anthers* 10, half as long as the tube, ovate, included. *Ovary* minute, depressed, pubescent, 3-celled, 3-ovuled; *stigma* short, cylindric, glabrous. *Fruit* (young) broadly obovoid, deeply 3-grooved, puberulous, 3-celled, with a single seed in each cell. *Aglaia Maingayi*, Hiern in Hook. fil. Fl. Br. Ind. I, 562. C. DC. Monogr. Phaner. I, 588.

Malacca: Maingay (Kew Distrib.), No. 342 (Herb. prop. No. 1910).
Perak: King's Collector, No. 3325, Scortechini.

Doubtful Species.

A tree has been collected in Perak both by Mr. Wray and Mr. Kunstler (Collector of the Calcutta Botanic Garden), which I believe to be *Aglaia Korthalsii*, Miq. The Perak specimens are in fruit only; and it is only by comparison with Miquel's type specimen of *A. Korthalsii* in the Leiden Herbarium (which is in flower only), that I have made the identification. The species closely resembles *A. macrostigma*, King, but has shorter leaves with more slender rachises and petiolules: the fruit is also larger and more obovoid. I have distributed the Perak plant as doubtfully *A. Korthalsii*, but not having flowers, I do not describe it here.

8. LANSIUM, Rumph.

Trees with unequally pinnate leaves; the leaflets quite entire, alternate or opposite, shortly petiolulate. *Flowers* polygamo-dioecious, 5-merous, axillary, the male usually paniculate, the female spicate-racemose. *Sepals* rounded, imbricated. *Petals* rounded, connivent, concave, imbricated. *Staminal tube* globose, the mouth entire or crenulated; *anthers* 10, obtuse, usually in two rows, the shorter ones included, the longer partly exserted, sometimes apiculate. *Disk* obsolete. *Ovary* globose, 3-5-celled; cells 1-2-ovuled; *style* very short, thick; *stigma* truncate, 3-5-lobed. *Fruit* baccate, edible, 1-5-celled, cells

1-2-seeded; *seeds* oblong, invested in a pulpy aril, exalbuminous.—

DISTRIB. Four species, all Indo-Malayan.

Leaflets 5 to 10 in. long; main nerves about

10 pairs ... 1. *L. domesticum*.

Leaflets 2 to 3 in. long: main nerves very

numerous ... 2. *L. cinereum*.

Doubtful species ... 3. *L. pedicellatum*.

1. *LANSIUM DOMESTICUM*, Jack in Trans. Linn. Soc. XIV, 115, t. IV. f. 1. A tree 30 to 50 feet high; young branches with pale glabrous lenticellate bark. *Leaves* 12 to 18 in. long; leaflets 5 to 7, alternate, coriaceous, oblong-elliptic, sometimes slightly obovate, abruptly shortly and obtusely acuminate, narrowed and slightly unequal at the base; both surfaces shining, reticulate, glabrous or slightly puberulous toward the base; main nerves about 10 pairs, ascending, curved, depressed on the upper, prominent on the lower surface when dry; length 5 to 10 in., breadth 2·75 to 4 in., petiolules ·5 in.; the terminal 1 in., jointed. *Hermaphrodite spikes* from the trunk and larger branches, solitary or in fascicles, pubescent, much shorter than the leaves. *Flowers* sessile or on very short pubescent pedicels, solitary, minutely bracteolate at the base. *Calyx* fleshy, puberulous, with 5 shallow rounded teeth. *Petals* longer than the calyx, sub-rotund, glabrous. *Staminal tube* sub-globose, the mouth sub-entire, truncate, shorter than the petals, the stamens in a single row. *Ovary* sub-globular, tomentose, 5-celled; *style* short, thick, 10-furrowed; *stigma* large, discoid. *Berry* oblong-ovate to obovoid, sub-tomentose, 1 to 1·5 in. long; *seeds* usually about 2, embedded in much transparent pulp. Correa de Serra in Ann. Mus. X, 157, t. 7, fig. 1; Blume Bijdr. 165; A. Juss. Mem. Mel. 81; Miq. Fl. Ind. Bat. Vol. I, Pt. 2, 545; Hiern in Hook. fil. Fl. Br. Ind. I, 558; C. De Cand. Monogr. Phaner. I, 598.

Malacca: Griffith, Maingay (Kew Distrib.), No. 338. Perak: Wray, King's Collector, common. Cultivated in all the Provinces, except the Andamans and Nicobars, on account of its edible fruit. DISTRIB. The Malayan Archipelago.

There are several varieties of this which have been by some authors regarded as species, *e.g.*, *L. aqueum*, Jack, *L. humile*, Hassk.

2. *LANSIUM CINEREUM*, Hiern in Hook. fil. Fl. Br. Ind. I, 558. A tree; young branches tawny-pubescent at first, afterwards cinereous. *Leaves* 3 to 5 in. long, unequally pinnate; leaflets 3 to 5, opposite, sub-coriaceous, elliptic-oblong, obtusely cuspidate, the base acute; both surfaces quite glabrous, pale when dry; main nerves very numerous, obscure; length 2 to 3 in., breadth ·8 to 1·5 in., petiolules ·1 to ·25 in. *Spikes* nearly as long as the leaves, glabrous. *Flowers* hermaphrodite.

Calyx cupular, puberulous, with 5 obscure rounded teeth. *Petals* obovate, glabrous. *Anthers* oblong, mucronate. *Ovary* globose, pubescent, 5-celled, longer than the glabrous style. *Fruit* unknown. C. DC. Monogr. Phaner. I, 598.

Malacca: Maingay (Kew Distrib.), No. 339.

Known only by Maingay's scanty specimens.

3. *LANSIUM PEDICELLATUM*, Hiern in Hook. fil. Fl. Br. Ind. I, 558. A tree; young branches pale brown, scaly. *Leaves* 9 to 12 in. long, unequally pinnate; leaflets 3 to 5, alternate or sub-opposite, thinly coriaceous, elliptic, shortly and sharply acuminate; the base oblique, obtuse or cuneate; both surfaces glabrous; main nerves 8 to 10 pairs, ascending, spreading, slightly prominent beneath; length 3 to 6 in., breadth 1·5 to 2·5 in., petiolules ·15 to ·25 in. *Male flowers and inflorescence* unknown. *Racemes of female flowers* 1 to 2 in. long, axillary, sometimes with a branch at the base; flowers on pedicels ·1 to ·15 in. long. *Ovary* minutely tomentose, 4-celled; *stigma* sessile. *Young fruit* sub-globose, fleshy, shortly tomentose.

Malacca: Maingay (Kew Distrib.), No. 356.

The above description is drawn up from the only two specimens which I have seen, and from Hiern's and De Candolle's descriptions. There is nothing in it to connect the species absolutely with *Lansium*, the genus in which its author has placed it.

9. *WALSURA*, Roxb.

Trees. *Leaves* 1-9-foliolate; leaflets opposite, entire, pale beneath. *Panicles* axillary and terminal; *Flowers* small, hermaphrodite. *Calyx* short, 5-fid or -partite, the lobes spreading, imbricated in bud. *Petals* 5, ovate-oblong, spreading, slightly imbricated or sub-valvate. *Filaments* 10 or 8, linear or flattened, free or connate in a tube; *anthers* terminal or inserted in the notch at the apex of the filament. *Disk* usually annular, fleshy. *Ovary* short, 2-3-celled, imbedded in the disk, style rather short; *stigma* turbinate-capitate, 2-3-dentate; *Ovules* 2 in each cell. *Fruit* baccate, shortly tomentose, indehiscent, 1- rarely 2-celled and -seeded; *seed* inclosed in a fleshy aril, exalbuminous. **DISTRIB.** about 12 species, Indo-Malayan.

Filaments united near the base.

Leaflets 5 to 9, with 5 or 6 pairs of main
lateral nerves ...

Leaflets not more than 5, with 8 to 10
pairs of main lateral nerves.

Stigma discoid, fruit not apiculate 2. *W. neurodes*.

1. *W. multijuga*.

Stigma conical, with a large swollen
annulus round its base; fruit
apiculate ... 3. *W. Candollei*.

Filaments quite free.

Leaflets five, 5 to 7 in. long, glaucous
beneath, flowers .15 in. long ... 4. *W. hypoleuca*.

Leaflets three to five, 3 to 5 in. long,
not glaucous; flowers .25 in. long ... 5. *W. robusta*.

1. *WALSURA MULTIJUGA*, King n. sp. A tree 20 to 30 feet high: young branches cinereous, puberulous, not lenticellate. *Leaves* 5 to 9 in. long, rachis puberulous; leaflets 5 to 9, coriaceous, lanceolate or oblong-lanceolate, shortly acuminate, usually much narrowed but sometimes rounded and oblique at the base; both surfaces glabrous, the lower paler; main nerves 5 or 6 pairs, ascending, curved, slightly prominent on the lower surface: length 2.5 to 5 in., breadth .75 to 1.5 in., rarely 2 in., petiolules .15 to .2 in., the terminal .4 or .5 in. *Panicles* small, umbellate-cymose, pedunculate, much shorter than the leaves, clustered in the axils of the leaves or terminal, puberulous; the peduncles 1 to 2 in. long, the heads about 1 in. in diam. *Flowers* about .1 in. long, their pedicels shorter. *Calyx-teeth* short, broad, spreading. *Petals* 5, broadly elliptic, blunt, puberulous outside, longer than the calyx. *Stamens* 10, shorter than the petals; the filaments slightly united into a tube in the lower third, the upper two-thirds free, flattened, bifid at the apex, glabrous outside, pubescent inside below the anthers. *Anthers* small, ovate, inserted between the divaricating incurved teeth of the filaments. *Disc* proper, none. *Ovary* broadly obovoid or ovoid-globular, tapering into the very short style, glabrous; *stigma* small, capitate with a central mammilla. *Fruit* ovoid or ovoid-globose, apiculate, densely rusty-tomentose, .5 in. long without the apiculus. *Melospermum rubro-stamineum*, Scort. MS. in Herb. Calc.

Perak: Scortechini, Wray, King's Collector, very common. **DIST.** Sumatra, Upper Burma.

2. *WALSURA NEURODES*, Hiern in Hook. fil. Fl. Br. Ind. I, 564. A tree; young branches cinereous-puberulous. *Leaves* 6 to 8 in. long; leaflets 5, narrowly elliptic or elliptic-oblong, shortly and bluntly acuminate, the base cuneate or rounded; upper surface glabrous, shining, the lower glaucous; main nerves 8 to 10 pairs, spreading, rather prominent beneath; length 2 to 4 in., breadth 1 to 2 in., petiolule .25 to .35 in., the terminal one 1 in. *Panicles* equal to or longer than the leaves, on rather long peduncles, their lateral branches lax, short, the flowers near their apices and not numerous. *Flowers* .15 in. long, pedicels shorter. *Calyx* with 5 short broad ovate spreading teeth. *Petals*

5, broadly elliptic, blunt, glabrescent inside, puberulous outside. *Stamens* 10, shorter than the petals; the filaments flattened, pubescent, faintly united in their lower third but easily separable, inserted outside the annular entire glabrous disc. *Ovary* pubescent, surrounded by the disc, ovoid-conic, tapering into the thick glabrous style; *stigma* discoid, small. *Fruit* ovoid or ovoid-rotund, minutely puberulous, not apiculate, about .65 in. long. C. DC. Monogr. Phaner. I, 636.

Malacca: Maingay (Kew Distrib.), Nos. 344 and 345. Griffith, No. 1057 (Kew Distrib.). Perak: Wray, No. 3798.

3. *WALSURA CANDOLLEI*, King, n. sp. A small tree; young branches glabrous, lenticellate, dark-coloured when dry. *Leaves* 4 to 7 in. long, unequally pinnate; leaflets usually 5, membranous, lanceolate, sub-acute, the base rounded; both surfaces glabrous, the lower pale, sub-glaucous; main nerves 7 to 11 pairs, spreading, curving; length 2 to 4 in., breadth .75 to 1.2 in., petiolules .2 to .4 in. *Panicles* puberulous, crowded towards the ends of the branches, axillary, on slender pedicels 2 to 3 in. long, corymbosely cymose, about 1.5 in. across. *Flowers* .1 in. long, sub-globular, on pedicels about as long as themselves. *Calyx* of 5, free ovate concave spreading sepals, pubescent externally. *Petals* 5, much larger than the sepals, elliptic-ovate, sub-acute, puberulous. *Stamens* 10, the filaments united into a tube in their lower third, pubescent, the alternate shorter, all inserted outside the thick glabrous annular disc. *Anthers* attached to the apices of the filaments, broadly ovate, short, sparsely pubescent. *Ovary* pubescent, conical, surrounded by the disc. *Style* short, ob-conical; *stigma* conical, surrounded at the base by a projecting fleshy annulus. *Fruit* ovoid-globose, with a slightly curved conical apiculus, densely but minutely rusty-puberulous, .75 in. long.

Andaman Islands; Kurz, King's Collector.

This species is allied to *W. neurodes*, Hiern, from which it differs in its more hairy petals and stamens, thicker style, more conical stigma and apiculate fruit. I dedicate the species to M. Casimir De Candolle, who first detected it as new from fragmentary specimens sent to him by the late Mr. Kurz. M. De Candolle did not include it in his Monograph of *Meliaceæ* (Monogr. Phaner. Vol. I), but kindly communicated the fact of his discovery to me. Specimens since sent to me by the collectors of the Calcutta garden confirm the accuracy of his decision.

4. *WALSURA HYPOLEUCA*, Kurz Rep. Veg. Andam. ed. 2, p. 33. A tree 40 to 50 feet high; young branches stout, puberulous, lenticellate. *Leaves* 12 to 14 in. long, glabrous; leaflets 5, thinly coriaceous, elliptic-oblong, sub-acute, the base cuneate; upper surface shining, the lower glaucous; main nerves 7 or 8 pairs, ascending, prominent beneath;

length 5 to 7 in., breadth 2 to 3 in., the terminal one a third larger and with more nerves; petiolules $\cdot 75$ in., that of the terminal leaflet 2 in. *Panicles* several from an axil, 4 to 6 in. long, pubescent, the branchlets short and slender with the flowers crowded near their apices. *Flowers* $\cdot 15$ in. long, on short puberulous pedicels. *Calyx-teeth* 5 or 6, elongate, ovate or lanceolate, puberulous. *Petals* 5, longer than the calyx, elliptic-obtuse, erect, puberulous. *Stamens* 10, distinct, inserted outside the disc, shorter than the petals; the filaments flattened, but not quite so broad as the ovate anthers, sparsely villous. *Disc* annular, cushion-like, entire, glabrous, surrounding the ovoid-conic, villous, ovary. *Style* cylindric, thickened upwards, glabrous; *stigma* discoid. Unripe fruit (*fide* Kurz) "oblong, acuminate, greyish-velvety." Kurz in Journ. As. Soc. Bengal, Vol. 41, Pt. 2, p. 296; For. Flora Burma I, 224; Hiern in Hook. fil. Fl. Br. Ind. I, 564. C. D. Cand. Monogr. Phaner. I, 639.

Andaman Islands: at Port Mowat.

This has been collected only by Kurz and I have never seen its fruit. I believe Kurz's species *C. oxycarpa* is merely a small-leaved form of this. Kurz distinguishes it from this by its thinner leaves and fainter venation,—characters of little value, I fear.

5. *WALSURA ROBUSTA*, Roxb. Hort. Beng. 32: Fl. Ind. II, 386. A tree 40 to 60 feet high; young branches slender, lenticellate, glabrous. *Leaves* 7 to 12 in. long. *Leaflets* 3 to 5, sub-coriaceous, ovate-oblong to ovate, entire, bluntly acuminate, the base narrowed; both surfaces glabrous, the upper shining, the lower dull with the 6 or 7 pairs of curving nerves rather prominent; length 3 to 5 in., breadth $1\cdot 75$ to $2\cdot 25$ in.; petiolules about $\cdot 5$ in., that of the terminal leaflet $1\cdot 5$ in. *Panicles* dense, many-flowered, shorter than the leaves, cinereous-puberulous; bracts (if any) deciduous. *Flower-buds* hemispheric, tomentose, subsessile. *Petals* $\cdot 2$ in. long (larger than the sepals). *Stamens* 10; the filaments flattened, lanceolate, puberulous, free from each other, inserted outside the broad, thin, sub-concave, pubescent disk. *Ovary* depressed-globose, crowned by the thick style, 2-celled, with 2 ovules in each cell; *stigma* discoid with a central mammilla. *Fruit* elliptic or globular, $\cdot 75$ in. in diam., when dry capsular, 2-celled, but one of the cells empty. *Seed* pendulous, testa membranous, albumen 0; the cotyledons fleshy, plano-convex; the radicle short, superior. Hiern in Hook. fil. Fl. Br. Ind. I, 565: Kurz For. Fl. Burm. I, 223; C. De. Cand. Monogr. Phaner. I, 638; Wall. Cat. 1266, 8110, 8111, 8112. *Surwala robusta*, Roem. Synops. i. 108. *Monocyclis robusta*, Wall. ex Voigt Hort. Suburb. Calcutta 135. *Scytalia glabra*, Hb. Ham. ex Wall. Cat. 8048 E, (not the other letters.)

Andaman Islands: very common. **DISTRIB.** Brit. India, in Burma, Silhet, Assam, Sikhim.

10. HEYNEA, Roxb.

Trees or rarely shrubs. *Leaves* 5-11-foliolate; leaflets opposite, entire. *Panicles* terminal and axillary, corymbose, long-peduncled; *Flowers* rather small, hermaphrodite. *Calyx* short, 4-5-fid, the lobes imbricate. *Petals* 4-5, oblong, suberect, sub-imbricate. *Staminal tube* 8- or 10-fid; lobes linear, bidentate at apex, bearing the anthers between the linear teeth. *Disk* annular, fleshy. *Ovary* immersed in the disk, 2-3-celled, narrowing into the short style; *stigma* 2-3-dentate, with a thickened ring at the base; *ovules* 2 in each cell. *Fruit* capsular, 1-celled, 2-valved, 1-seeded, glabrous. *Seed* arillate, exalbuminous; aril thin, white; cotyledons hemispherical.—**DISTRIB.** 1-3 species, limited to Indo-Malaya.

HEYNEA TRIJUGA, Roxb., Hort. Beng. 33. A small tree 15 to 20 feet high. *Leaves* 6 to 16 in. long; leaflets broadly ovate to ovate-lanceolate, shortly acuminate, the base rounded or cuneate; upper surface glabrous, the lower surface glaucous, glabrous or pubescent; the 6 to 8 pairs of curving spreading nerves slightly prominent; length 2·5 to 5·5 in., breadth ·8 to 2·75 in., petiolule ·15 to ·45 in., the terminal ones longer. *Panicles* glabrous as long or nearly as long as the leaves, on long peduncles, with numerous corymbose branches. *Flowers* ·15 in. long. *Petals* much longer than the calyx, their midribs thick, their edges membranous. *Staminal tube* wide. *Ovary* glabrous. *Fruit* ovoid, beaked; the pericarp somewhat fleshy, smooth, splitting by 2 rarely 3 valves. Roxb. in Bot. Mag. t. 1738; Corom. Plants III, 260; Flor. Ind. II, 390; Grah. Cat. Bomb. Pl. 31; Adr. Juss. in Mem. Mus. xix. t. 18, f. 17; Dalz. & Gibs. Bomb. Fl. 38; Wall. Cat. 1258; Brandis For. Fl. 70. DC. Prod. I, 624; Monogr. Phaner. I, 713; Hiern in Hook. fil. Fl. Br. Ind. I, 565. *H. affinis*, Adr. Juss. l.c. 275; Beddome Fl. Sylvat. t. 134; W. & A. Prodr. i. 121. *Walsura (Heynea) pubescens*, Kurz in Journ. Asiat. Soc. Beng. xli. ii. 297. *Walsura trijuga* Kurz For. Fl. Burm. I, 225. *H. connaroides*, Wight ex Voigt Hort. Suburb. Calcutta 136.

Perak: common, and probably also in the other provinces.—**DISTRIB.** British India, Sumatra.

Var. *multijuga*. DC. Monogr. Phaner. I, 714. Leaflets 11, lanceolate. *H. quinquejuga*, Roxb. Hort. Calc. 90; Fl. Ind. II, 391. Wall. Cat. 1259. *H. Sumatrana*, Miq. Ann. Mus. Lugd. Bat. IV, 60; DC. Monogr. Phaner. I, 714.

Penang: Wallich, No. 1259. Curtis, No. 676.

11. CARAPA, Aubl.

Glabrous littoral trees. *Leaves* 2- or 4- or sometimes 6-foliolate; leaflets opposite, quite entire, the nerves faint. *Panicles* lax, axillary, cymose, flowers hermaphrodite. *Calyx* 4-fid, short. *Petals* 4, reflexed. *Staminal tube* urceolate-globose, 8-dentate, the teeth bi-partite: *anthers* 8, 2-celled, included, alternating with the teeth. *Disk* fleshy, cup-shaped, adherent to the base of the ovary. *Ovary* 4-celled, 4-sulcate, the *cells* 2-8-ovuled; *style* short, *stigma* discoid. *Fruit* capsular, sub-globose, large, 4-celled, 6-12-seeded; pericarp fleshy, dehiscing by 4 valves. *Seeds* large, thick, angular; testa hard, spongy, aril 0, hilum large, ventral; cotyledons amygdaloid.—DISTRIB. About 6 species, all tropical and usually littoral.

Leaves with broad blunt apex and narrow base, coriaceous; panicles stout; fruit as large as an orange ... 1. *C. obovata*.

Leaves with sub-acute apex and broad base, very thinly coriaceous; panicles slender: fruit 7 to 10 in. in diam. ... 2. *C. moluccensis*.

1. CARAPA OBOVATA, Blume Bijdr. 179. *Leaves* 3 to 6 in. long; leaflets 1 to 2 pairs, coriaceous, obovate to oblong, the apex broad, obtuse, rarely notched or sub-acute, the base narrowed; main nerves 6 to 9 pairs, length 3 to 4 in., breadth 1.35 to 1.75 in., petiolules .2 to .35 in. *Panicles* 1.5 to 2.5 in. long, stout, cymose, few-flowered. *Flowers* .25 in. long, their pedicels .3 to .5 in. long, bracteolate. *Calyx-teeth* broad, rounded. *Petals* much longer than the calyx, broadly elliptic, the edges imbricate. *Ovary* broadly ovoid. *Fruit* the size of an orange, apiculate when young, but not when ripe. C. DC. Monogr. Phaner. I, 718: Seemann Flora Vitiensis p. 28. *C. moluccensis*, Kurz (not of Lamk. For. Flor. Br. Burma, I, 226: *C. moluccensis*, (in part,) Hiern in Hook. fil. Fl. Br. Ind. I. 567. *Xylocarpus obovatus*, A. Juss. Mem. Mel. p. 92; Miq. Fl. Ind. Bat. I, Pt. 2, p. 546.

Malacca: Maingay, (Kew Distrib.) No. 347; Griffith, No. 1098. Perak; Scortechini, King's Collector. South Andaman; Kurz, King's Collectors. Little Andaman: Prain. DISTRIB. Sunderbuns of Bengal: (Heinig) and others; Java and other islands of the Malayan Archipelago. Tropical Africa.

2. CARAPA MOLUCCENSIS, Lamk. Encyc. Meth I, 621. *Leaves* 4 to 10 in. long; leaflets usually 2 pairs, thinly coriaceous, almost membranous, broadly ovate to ovate-oblong, sub-acute, the base broad, unequal; main nerves about 6 pairs, spreading; length 2 to 4 in., breadth 1.5 to 2.35 in., petiolules .15 to .25 in. *Panicles* 3 to 5 in. long, slender, with lax spreading few-flowered branches. *Flowers* as in the last, but

with rather broader petals and a shorter style. *Fruit* sub-globular, 7 to 10 in. in diam. Blume Bijdragen, 179; C. DC. Monogr. Phaner. I, 719; Don. Gen. Syst. I, 686; DC. Prod. I, 626; Bedd. Flor. Sylvat. t. 136; Seeman Flor. Viti, 38; Hiern in Hook. fil. Fl. Br. Ind., (*in part*,) I. 567. *C. indica*, A. Juss. Dict. Sc. Nat. VII., p. 31. *Xylocarpus granatum*, Willd. Spec. III, 328; A. Juss. Mem. Mel. p. 92, t. 20, No. 22; Roxb. Fl. Ind. II, 240; Wight and Arn. Prod. 121; Blanco Flor. Philipp. ed. 2, p. 207; A. Gray U. S. Exped. I, 243. *X. granatum*, Koenig, Miq. Fl. Ind. Bat. I, Pt. 2, p. 546; *X. Forstenii* Miq. Ann. Mus. Lugd. Bat. IV, 62.

South Andaman Island; Kurz, King's Collectors. Great Coco Island; Prain. DISTRIB. Burma, Malayan Archipelago, S. India, Fiji Islands, Africa.

12. CHICKRASSIA, Adr. Juss.

A tree with pari-pinnate leaves, alternate sub-opposite or opposite oblique entire leaflets, terminal panicles and 4-5-merous flowers. *Calyx* short, dentate. *Petals* oblong, free, imbricate, erect. *Staminal tube* cylindric; its mouth with 10 short blunt teeth. *Anthems* 10, short, attached to the edge of the mouth and entirely exserted. *Disk* none. *Ovary* cylindric, on a short stalk, 3-celled; the ovules numerous, in 2 rows in each cell; *style* very short, stout; *stigma* capitate. *Capsule* woody, 3-celled, loculicidal; the pericarp separating into two layers. *Seeds* numerous, flat, winged below, exalbuminous. A single species.

CHICKRASSIA TABULARIS, A. Juss. in Mém. Mus. XIX, 251, t. 22, f. 27. A tall tree; young branches stout, lenticellate, sub-glabrous. *Leaves* 12 to 18 in. long; leaflets 10 to 16, ovate to oblong, unequal-sided, acute or acuminate; the base rounded on one side, narrowed on the other: upper surface glabrous, the lower glabrous or more or less velvety; length 2 to 5 in., breadth 1 to 2.5 in., petiolules .15 to .35 in. *Panicles* terminal, erect, shorter than the leaves; the branches spreading, pubescent, many-flowered. *Flowers* .4 to .5 in. long. *Calyx* with 5 short, shallow, broad teeth, pubescent outside. *Petals* puberulous outside, pubescent inside. *Capsule* ovoid, 1.75 in. long; seeds .65 in. long. W. and A. Prod. 123; Thwaites Enum. 61; Wight Ill. t. 56; Bedd. Fl. Sylvat. t. 9; Grah. Cat. Bomb. Pl. 32; Kurz For. Flora Burm. I, 227; Hiern in Hook. fil. Fl. Br. Ind. I, 568; C. DC. Monogr. Phaner. I, 726. *Swietenia Chickrassia*, Roxb. Hort. Beng. 33; Fl. Ind. II, 399. *Plageotaxis Chickrassia*, Wall. Cat. 1269. *S. Sotrophola*, Ham. ex Wall. Cat. p. 214. *Chickrassia triloculuris* Roem. Syn. I, 135; Roxb. ex Buch. Journ. I, 184; G. Don. Gen. Syst. I, 688. *Cedrelae* sp. Wall. Cat. 4892.

Var. *velutina*, leaflets, more or less velvety beneath. *C. velutina*

Roemer Synops. fasc. I, p. 135; Kurz For. Flora Burma I, 227; C. DC. Monogr. Phaner. I, 717. *C. Nimmonii* Grah. in Wight Ill. 148; Dalz. and Gibs. Fl. Bombay, 38. *Plageotaxis velutina*, Wall. Cat. 1270. *Cedrela velutina*. DC. Prod. I, 625. ? *Cedrela villosa*, Roxb. Hort. Beng. 18. ? *Melia tomentosa*, Kurz Rep. Veg. Andam. ed. i. p. iv., (not of Roxburgh). ? *Toona velutina*, Roem. Synops. Monogr., i. 139. ? *T. villosa*. Roem, l. c. 140.

Malacca: Maingay. Andaman Islands: King's Collectors. DISTRIB. Burma, British India, Ceylon.

13. CEDRELA, Linn.

Tall trees with coloured wood. *Leaves* pinnate; leaflets numerous, opposite or sub-opposite, entire or serrate. *Panicles* terminal and sub-terminal. *Flowers* white, pentamerous. *Calyx* short, 5-cleft. *Petals* sub-erect, oval, imbricated, free. *Stamens* 5, free, inserted at the top of the disk, rarely alternating with staminodes, filaments subulate. *Anthers* oblong, versatile. *Disk* thick or raised, 5-lobed. *Ovary* sessile on the top of the disk, 5-celled; *cells* alternate with the calyx-lobes, each with 8-12 bi-seriate pendulous ovules; *style* filiform; *stigma* discoid. *Capsule* coriaceous, 5-celled, septifragally 5-valved, *valves* consisting of two plates. *Seeds* compressed, winged at the apex or at both ends, with fleshy albumen; *cotyledons* flat, sub-foliaceous.—DISTRIB. About 16 species, inhabiting Tropical Asia, Australia, and America.

CEDRELA FEBRIFUGA, Forsten Diss. Cedrel. 16. A tree 80 to 150 feet high; young branches puberulous, lenticellate. *Leaves* 15 to 24 in. long, glabrous; leaflets membranous, 7 to 10 pairs, obliquely ovate-oblong, shortly and bluntly acuminate, the base broad and unequal-sided, the edges entire; main nerves 12 to 15 pairs, sub-horizontal, distinct beneath when dry; length 3.5 to 4.25 in., breadth 1.75 to 2 in., petiole .2 in. *Panicles* terminal, shorter than, or as long as the leaves, spreading, glabrous; their ultimate branches short, cymose, crowded. *Flowers* .2 in. in diam., on short pedicels. Segments of the calyx spreading, much shorter than the petals, obtuse, pubescent at the edges. *Petals* broad, obtuse, pubescent. *Stamens* 6, slightly shorter than the petals, the filaments and ovary sericeous. *Capsule* 1 in. long, lenticellate. *Seeds* winged at each end, .6 to .7 in. long. Blume Bijdr. I, 180; A. Juss. Mem. Mel. 103; Miq. Flor. Ind. Bat. V. I, pt. 2, 548; Suppl. 197; Ann. Mus. Lugd. Bat. IV, 63; De Cand. Monogr. Phaner. I, 744. *C. Toona*, Hiern (not of Roxb.) Hook. Fl. Br. Ind. I, 569. *Toona febrifuga*, Roem. Syn. fasc. I, 139.

Penang: Curtis, No. 826. Perak: King's Collector, No. 10403.

In the Flora of British India, Mr. Hiern has reduced this to
J. II. 12

C. Toona, Roxb. And there is no doubt that the flowers of the two are very similar, differing chiefly in the hairiness of the petals and stamens of *C. febrifuga*. The panicles, however, of *C. febrifuga* are longer and their ultimate branches are shorter and denser than those of *C. Toona*. The capsules, moreover, are much longer (1 in. as against .6 in.). The flowers of all the species of *Cedrela* are very much alike. I hesitate therefore, to follow Mr. Hiern merely because very good distinctive characters cannot be had from the flowers, and I prefer to follow De Candolle in maintaining this as a species. The nearest ally of *C. febrifuga* is undoubtedly *C. microcarpa* C. DC.

Order XXVIII. CHAILLETIACEÆ.

Trees or shrubs. *Leaves* alternate, quite entire; *stipules* 2, deciduous. *Flowers* small, unisexual or polygamous, in corymbose cymes; *peduncles* sometimes adnate to the petiole. *Sepals* 5, free or connate, sometimes unequal, imbricate. *Petals* 5, free, sub-perigynous, equal or unequal, notched or 2-fid, with often an inflexed lamina which is adnate to the face of the petal, usually open in æstivation. *Stamens* 5, sub-perigynous, all or some only fertile, free or adnate to the corolla; *Anthers* oblong, connective often thickened at the back. *Disk* of 5 glands or scales, or a 5-glandular or -lobed cup. *Ovary* free, pubescent or villous, 2-3-celled; *styles* 1-2-3, free or more or less connate; *stigmas* simple or capitate; *ovules* anatropous, pendulous in pairs from the top of each cell. *Drupe* pubescent or hispid, oblong, transversely oblong or didymous, compressed; *epicarp* entire or dehiscent; *endocarp* indehiscent or not, 1-3-celled; *cells* 1-seeded. *Seed* pendulous, hilum broad, testa membranous, albumen 0; *embryo* large; *cotyledons* thick, radicle small, superior.—A small chiefly tropical order, of 3 genera and about 40 species.

I. CHAILLETIA, DC.

Flowers polygamo-monœcious. *Sepals* 5, unequal, united at the base or above it, obtuse. *Petals* 5, 2-lobed, narrow, free. *Stamens* 5, sometimes slightly adnate at the base to the petals. *Disk* of 5 quadrate scales placed opposite the petals. *Ovary* 2-3-celled.—DISTRIB. Tropical Asia, Africa, and especially America; species about 30.

Leaves oblong or elliptic, lanceolate.

Leaves very thin, quite glabrous; cymes

globular, .25 in. to .4 in. in diam. ... 1. *C. tenuifolia*.

Leaves coriaceous, glabrous except the

midrib, strigose at the base; cymes 1 to

2 in. in diam. ... 2. *C. Hookeri*.

- Leaves membranous, with many fulvous
bristles on the edges midribs and nerves 3. *C. Griffithii.*
- Leaves elliptic or oblong-elliptic
Midribs of leaves strigose beneath; cymes
·5 in. in diam.; ripe drupes ·65 in. broad 4. *C. Helferiana.*
- Midribs of leaves quite glabrous; cymes
·3 in. in diam.; ripe drupes 1·25 in. in
diam. ... 5. *C. Laurocerasus.*
- Leaves elliptic but more or less ob-lanceo-
late or obovate, glabrous ... 6. *C. andamanica.*
- Leaves elliptic-obovate, retuse, minutely tomen-
tose on the lower surface ... 7. *C. deflexifolia*
var. *tomentosa.*

1. CHAILLETIA TENUIFOLIA, King, n. sp. A shrub, 6 feet high; young branches, angular, puberulous. *Leaves* thinly membranous, elliptic-lanceolate, tapering to either end, the apex shortly acuminate: both surfaces glabrous and reticulate; main nerves 5 to 8 pairs, ascending, curving and interarching boldly, depressed on the upper, prominent on the lower surface; length 6 to 8 in., breadth 2·25 to 2·75 in.; petiole ·15 in., strigose. *Cymes* small, globular, ·25 to ·4 in. in diam., axillary, solitary; their pedicels ·15 in., strigose. *Flowers* sub-globular, ·05 in. in diam. *Sepals* erect, elliptic, obtuse, minutely sericeous outside, glabrous inside. *Petals* shorter but broader than the sepals, glabrous, slightly bifid at the apex, the lobes sub-acute. *Stamens* shorter than the petals, the filaments slightly sericeous, shorter than the oblong innate anthers, connective slightly sericeous. *Ovary* ovoid, densely sericeous-lanate; *style* short. *Ripe fruit* deeply 3-lobed ·6 in. long and ·75 in. broad.

Perak: King's Collector, No. 3498.

This species shows no tendency to become scandent.

2. CHAILLETIA HOOKERI, King, n. sp. A climber; young branches terete, puberulous at first, afterwards glabrous. *Leaves* coriaceous, oblong-lanceolate and acuminate (rarely oblong and obtuse or sub-acute), the base narrowed, reticulate and shining on both surfaces, glabrous except a few strigose hairs on the midrib near the base; main nerves 8 to 10 pairs, curving and interarching far from the edge; length 4·5 to 6·5 in., breadth 1·5 to 2 in.; petiole ·25 in., strigose. *Cymes* axillary, usually in pairs, pedunculate, tomentose, dichotomous, spreading, 1 to 2 in. in diam., the peduncles ·5 to ·75 in. long. *Flowers* about ·1 in. long. *Sepals* oblong, blunt, erect, concave, sericeous-tomentose outside, glabrous inside. *Petals* glabrous, shorter but broader than the sepals, deeply divided into two concave irregularly obovate overlapping

segments. *Stamens* about as long as the petals, glabrous; *anthers* adnate, blunt, broad, the cells on the edges of the connective. *Ovary* ovoid, densely lanate-sericeous; *style* elongate, thin. *Ripe drupe* unknown. Wall. Cat. No. 7443.

Penang: Porter. Perak: Scortechini.

This is the species referred to by Sir Joseph Hooker (Fl. Br. Ind. I, 572), as probably an undescribed species of *Chailletia*. The species, when Sir Joseph wrote, was known only by Porter's incomplete specimens. A few specimens of what is evidently the same plant were collected by the late Father Scortechini in Perak, and these have enabled me to describe the flowers. The fruit, however, still remains unknown.

3. *CHAILLETIA GRIFFITHII*, Hook. fil. Fl. Br. Ind. I, 571. A slender climber; young branches striate, dark-coloured when dry, clothed with numerous long, spreading, stiff, fulvous hairs with minute soft, short, white pubescence between. *Leaves* membranous, oblong-lanceolate, acuminate, the base rounded or minutely cordate; upper surface glabrous except the sparsely bristly midrib, the lower with numerous bristles on the midrib and a few scattered elsewhere chiefly on the nerves, the edges ciliate; main nerves 9 to 11 pairs, ascending, rather bold beneath; length 4 to 7 in., breadth 1 to 2 in., petiole .1 in., densely bristly. *Cymes* globular, axillary, sessile, densely bristly, .4 to .5 in. in diam. *Flowers* campanulate, nearly .25 in. across at the mouth. *Sepals* sub-erect, narrowly ovate, densely sericeous on the outer, and slightly pubescent on the inner surface. *Petals* glabrous, not longer than the sepals but broader, obovate, the apex shortly bifid, the lobes sub-acute, concave. *Stamens* as long as the petals, the anthers short, broadly ovate, the cells anterior. *Ovary* ovate, densely lanate-sericeous; *style* shorter than the stamens; *stigmas* 3, small, truncate. *Ripe fruit* (*fide* Hooker) 1.5 in. long, 2-celled. *C. lanuginosa*, Maing. MSS.

Perak; King's Collector, No. 6117. Malacca; Griffith, No. 2169 (Kew Distrib.), Maingay, No. 370.

Griffith describes this as "a shrub." It is actually a climbing shrub 15 to 20 feet long. The flowers are white.

4. *CHAILLETIA HELFERIANA*, Kurz in Journ. As. Soc. Bengal, XLI, (1872), Pt. 2, 297. Scandent; young branches adpressed-yellowish pubescent, terete. *Leaves* thinly coriaceous, elliptic or oblong-elliptic, shortly and abruptly acuminate, the base cuneate, both surfaces reticulate (the lower rather obscurely so) and glabrous, the midrib strigose beneath; main nerves 7 or 8 pairs, spreading, faint; length 4 to 6 in., breadth 1.25 to 2.25 in.; petiole .25 in., strigose. *Cymes* solitary, axillary, about .5 in. in diam.; their pedicels about .3 in. long, strigose.

Flowers sub-globular, less than .1 in. long. *Sepals* broadly ovate, blunt, sericeous on the outer, pubescent on the inner surface. *Petals* smaller than the sepals, elliptic, obtuse, shortly bifid, the lobes blunt. *Filaments* very short, the anthers ovate, the cells anterior. *Ovary* conical, laxly sericeous. *Ripe drupe* transversely oblong, compressed, .65 in. broad, and only .4 in. long, minutely tomentose. Hook. fil. Fl. Br. Ind. I, 570.

Langkani; Curtis, No. 1687.—DISTRIB. Burma, Wall. Cat. 4038. Tenasserim; Helfer (Kew Distrib.), No. 2172.

Curtis's Langkani specimens are in fruit only, and those of Helfer's Tenasserim collecting (the type of the species) are in flower only. But the two seem identical. I have not seen the Wallichian sheet No. 4038.

5. *CHAILLETIA LAUROCERASUS*, Planch. ex Hook. fil. Fl. Br. Ind. I, 572. A scandent glabrous shrub 30 to 40 feet long; young branches slender, dark-coloured. *Leaves* coriaceous, elliptic or elliptic-oblong, obtusely acuminate, the base narrowed, upper surface shining when dry, the lower paler; main nerves 7 or 8 pairs, spreading, faint; length 3.5 to 4.5 in., breadth 1.5 to 2.5 in., petiole about .1 in. *Cymes* axillary, globose, few-flowered, .3 in. in diam., shortly pedunculate. *Flowers* .15 to .2 in. in diam. *Sepals* hoary outside, glabrous inside, broadly ovate or orbicular, concave. *Petals* longer than the sepals, glabrous, oblong, cut half way down into two oblong blunt concave slightly divergent segments. *Filaments* nearly as long as the petals; *anthers* shortly ovate. *Ovary* densely lanate-sericeous, broadly ovoid; *style* stout, *stigma* concave. *Drupe*s transversely oblong or globose, 1.25 in. in diam. when ripe, the epicarp hoary; *endocarp* thick, tubercled outside, 1- or 2-seeded. Wall. Cat. 7513, (*indeterminatæ*).

Penang; common. Perak: King's Collector.

6. *CHAILLETIA ANDAMANICA*, King n. sp. A small tree; young branches pale-brown, lenticellate, puberulous. *Leaves* thinly coriaceous, elliptic-oblongate or elliptic-obovate, abruptly and shortly blunt-acuminate, much narrowed at the base; both surfaces glabrous, minutely reticulate, pale when dry; main nerves 4 to 6 pairs, much curved and interarching far from the edge, only slightly prominent on either surface; length 3 to 4.75 in., breadth 1.25 to 2.5 in., petiole .15 to .2 in. *Stipules* lanceolate, about as long as the petiole. *Flowers* in dense axillary shortly pedunculate dichotomous cymes. *Buds* ovoid-globular. *Sepals* 5, sub-rotund, very concave, hoary externally, much imbricate. *Petals* 5, quadrate, not bifid, glabrous, shorter than the sepals. *Stamens* shorter than the petals, the filaments very short, anthers ovate. *Rudimentary ovary* ovoid, compressed, hairy. *Female flowers* not seen. *Fruit* about .5 in. broad, and .4 in. depth, transversely oblong, much compressed, puberulous, divided into two lobes by a deep vertical groove,

2-celled, 2-seeded, (often from the abortion of one of the cells) ovoid, 1-celled and 1-seeded.

South Andaman Island; King's Collectors.

The greatest breadth of the leaves in this species is above the middle, and in this respect it differs from *C. gelonoides*. The point of the leaves is also shorter than in that species; the flowers are less hairy, the cymes less crowded, and they are pedunculate and not sessile as in *C. gelonoides*.

7. *CHAILLETIA DEFLEXIFOLIA*, Turcz. in Bull. Mosc. 1863, pt. 1, 611, var. *tomentosa*. A climber, 10 to 30 feet long; young branches densely and minutely olivaceous-tomentose. *Leaves* thinly coriaceous, elliptic-obovate, retuse; upper surface minutely reticulate when dry, glabrous when adult except the minutely tomentose midrib and nerves; lower surface softly and minutely pilose, the midrib tomentose as are the 5 to 7 pairs of curved, spreading, main nerves; length 4·5 to 6·5 in., breadth 2·5 to 3·25 in., petiole ·3 to ·4 in. *Cymes* axillary, and often terminal, pedunculate, tomentose, dichotomous, spreading, often 3 in. in diam.; the peduncles 1 to 1·25 in. long, stout. *Flowers* ·25 in. in diam. *Sepals* oblong-lanceolate, deflexed, sericeous-tomentose outside, glabrous inside. *Petals* as long as the sepals, deeply divided into 2 lanceolate segments. *Stamens* as long as the petals, the anthers shortly ovate. *Ovary* densely lanate-sericeous, depressed globular, the style slender, stigma small. *Drupe*s compressed, rotund-reniform, sericeous, rugose, pitted, 1 in. broad; the endocarp very hard, 2-celled, 2-seeded. Hook. fil. Fl. Br. Ind. I, 571; Wall. Cat. 9016 (*indeterminatæ*).

Malacca; Griffith, Maingay. Perak; King's Collector, Wray, Scortechini.

Order XXIX. OLACINÆ.

Trees or shrubs, rarely herbs, sometimes climbing. *Leaves* alternate, rarely opposite, simple or lobed, penni- or palmi-nerved, exstipulate. *Inflorescence* cymose or racemose, rarely capitate, terminal, axillary or extra-axillary, sessile or more or less peduncled. *Flowers* regular, hermaphrodite, polygamo-dioecious or dioecious. *Calyx* usually small, 4–5-toothed, sometimes accrescent, free or adherent to the fruit, lobes valvate or imbricate. *Petals* 3–6, valvate or imbricate, free, or more or less coherent. *Stamens* 3–15, inserted with the petals, free or adnate to them and either opposite to or alternate with them, all fertile, or some (staminodes) anantherous, disunited or more or less monadelphous. *Anthers* erect, 2-celled, dehiscing longitudinally. *Disc* hypogynous or perigynous, cup-shaped, often absent. *Ovary* free, or half inferior, 1-celled or imperfectly 2–3–5-celled (from the dissepiments not

reaching the apex of the cavity). *Style* simple or 0, rarely divided; *stigma* 1 rarely 2, entire or lobed; *ovules* 1–5, pendulous from the apex of a minute free central placenta, or from the side or apex of the ovarian cavity; *funicle* (or placenta?) often dilated into a thickened process above the ovule. *Fruit* drupaceous or dry, indehiscent, 1- rarely 2-celled, 1- rarely 2-seeded, free, or more or less adnate to the calyx-tube and disk. *Seed* pendulous; albumen fleshy, entire or lobed, rarely 0; *radicle* superior; *cotyledons* leafy, flat or folded, rarely fleshy.—DISTRIB. Genera about 45, species about 220, widely distributed through the Tropics of both hemispheres.

The *Olacineæ* are rather an assemblage of plants than a Natural Order. The solitary character which is common to all the species included under the title is pendulous ovulation; and even that character is obscured by the fact that, in a number of the genera, the ovules are pendulous from the apex of a minute free central placenta which does not grow as the pistil develops, so that the seeds are erect in the fruit and have the appearance of originating from a basal placenta. In the remaining genera, both ovules and seeds are unmistakably pendulous from the apex, or from near the apex, of the cavities of the ovary and fruit. The majority of the genera have hypogynous stamens and superior fruit. But in *Erythrophalum* the stamens are perigynous and the fruit is inferior; while *Cansjera* and *Lepionurus* have their stamens perigynous in the flower, but the fruit (from the development of the fertilized pistil in a downward direction) is most distinctly inferior. In by far the greater majority of the species the stamens are free from each other, or, at the most, are slightly coherent by their bases: but in *Harmandia* the sessile anthers are attached near the mouth of a fleshy staminal tube like that found in *Meliaceæ*; and this tube, in an anantherous condition, is found in the pistillate flowers. By far the greater number of the genera have both calyx and corolla; but in *Cansjera* and *Lepionurus* the perianth is single, and in *Phytocrene* and *Miquelia* the organs which take the place of the outer whorl of the flower appear to be rather bracts than a true calyx. In most of the genera the petals are really free from each other; for, although many of them cohere by their edges for a time, they ultimately become separate; while in a smaller number there is genuine cohesion near their bases. In *Harmandia* however the corolla is gamopetalous and urceolate at all times and its texture is fleshy.

All the genera treated of below are woody except *Cardiopteris* which is herbaceous, and which moreover has milky juice. And all the genera have alternate leaves except *Ctenolophon* in which the leaves are opposite. The whole order appears to me to be in want of revision: and the study of the species described below leads me to incline to the opinion that several of the sub-tribes would be better treated as distinct natural orders; while one (*Opilieæ*) might be transferred to *Santalaceæ*.

FRUIT DRUPACEOUS: STIGMA 1.

Ovules pendulous from the apex of a minute axile placenta; seed spuriously erect.

Dichlamydeous, ♂: fruit superior.

Sub-Tribe I.—*Olacææ*. Stamens aniso-

merous, twice as many as or equal to and opposite the petals: ovary 2- to 5-celled at the base, 1-celled at the apex, or simply 1-celled.

Fruit superior.

Calyx much enlarged in the fruit.

Fertile stamens 3 to 5, not in a tube ... 1. *Ola*x.

Stamens 4, the filaments forming a fleshy tube ... 2. *Harmandia*.

Calyx not enlarged in the fruit.

Fertile stamens 12 to 15 ... 3. *Ochanostachys*.

Fertile stamens 5 ... 4. *Bracea*.

Fruit inferior ... 5. *Strombosia*.

Monochlamydeous, ♂ ; fruit inferior.

Sub-Tribe II.—*Opilieæ*. Stamens equal in number to the segments of the perianth and opposite to them; ovary 1-celled, 1-ovuled.

Scandent ... 6. *Cansjera*.

Shrubby ... 7. *Lepionurus*.

Ovules and seeds pendulous from the apex of the ovary and fruit.

* Stamens hypogynous.

Sub-Tribe III.—*Ximeniæ*. Stamens as many as or twice as many as the petals; ovary 2- to 4-celled at the base, 1-celled at the apex.

Leaves opposite ... 8. *Ctenolophon*.

Leaves alternate.

Fertile stamens 10.

Stamens hypogynous, free from the petals ... 9. *Ximenia*.

Stamens attached by pairs to the petals ... 10. *Scorodocarpus*.

Fertile stamens 6, concealed in the concavities of the petals ... 11. *Anacolosa*.

Sub-Tribe IV.— *Icacineæ*. Flowers dichlamydeous, ♂, or polygamo-dioecious: stamens equal in number to the petals and alternate with them; ovary 1- rarely 2-celled, ovules 2 (rarely 1). Shrubs or trees.

Ovary and fruit 1-celled.

Flowers polygamo-dioecious;
ovary in female flowers cylindric,
with large sessile discoid stigma.

Sepals 5, distinct, imbricate;
male flowers in short axillary
interrupted glomerulose
spikes 12. *Platea*.

Calyx cupular, 4 5-toothed,
flowers in cymes ... 13. *Gomphandra*.

Flowers hermaphrodite, stigma
minute 14. *Lasianthera*.

Ovary and fruit 2-celled, the cells
1-ovulate (1 cell aborting) ... 15. *Gonocaryum*.

Sub-Tribe V.—*Phytocreneæ*. Flowers
monoecious or dioecious, mono-ordi-
chlamydeous, 4- or 5-merous (the pieces
imbricate): stamens equal in number
to and alternate with the segments
of the perianth in the monochla-
mydeous, and with those of the corol-
la in the dichlamydeous species: ovary
1-celled, ovules 2. Scandent shrubs.

Flowers monochlamydeous.

Flowers 4-merous, those of both
sexes in capitules, bracteoles
close to the flower; drupe
bristly 16. *Phytocrene*.

Flowers 5-merous, the males
umbellate, the females capi-
tate, bracteoles separated
from the flower by a long
stalk; drupe not bristly ... 17. *Miquelia*.

Flowers dichlamydeous.

Flowers sessile in long pendulous
interrupted spikes; filaments
longer than the anthers:
drupe pulpy 18. *Sarcostigma*.

Flowers in cymose panicles;
filaments shorter than the
anthers; drupe with very
little, if any, pulp ... 19. *Iodes*.

** Stamens perigynous.

Sub-Tribe VI.—*Erythropaleæ*. Flowers dichlamydeous, ♂. Petals 5, perigynous, the stamens as many as and inserted opposite to them. Ovary half-immersed in the perigynous disk, 1-celled, with 1 to 3 ovules. Fruit inferior, crowned by the persistent calyxlobes and by the disc, pericarp splitting vertically into 3 to 5 pieces.

Scandent tendril-bearing shrubs ... 20. *Erythropalum*.

FRUIT SAMAROID; STIGMAS 2.

Sub-Tribe VII.—*Cardiopterideæ*. Flowers dichlamydeous, ♂ : corolla gamopetalous, the stamens equal to and alternate with its segments; ovules pendulous; stigmas 2, one at least of them persistent at the apex of the samaroid fruit.

Trees; ovary 2-celled, with 1 ovule in each cell, fruit 2-celled ... 21. *Pteleocarpa*.

Herbs; ovary 1-celled, ovules 2 (1 usually abortive), fruit 1-celled, juice milky ... 22. *Cardiopteris*.

1. OLAX, Linn.

Trees or shrubs, often scandent, sometimes armed. *Leaves* alternate, petioled, simple. *Racemes* axillary, simple, or branched. *Bracts* minute. *Calyx* minute, cup-shaped, truncate or obscurely toothed, accrescent. *Petals* 4 or 5, hypogynous, valvate, free or more or less coherent. *Fertile stamens* usually 3, generally opposite the edges of the petals and attached to their bases, rarely opposite their centres; *anthers* adnate to the filaments, oblong, 2-celled, dehiscing longitudinally. *Staminodes* 5-6, bifid, usually opposite the petals. *Ovary* free, usually surrounded by a shallow, cup-shaped, hypogynous disk, more or less 3-celled below, 1-celled above; *style* simple, terminal, stigma 3-lobed; *ovules* 3, linear, pendulous from the apex of a central placenta. *Fruit* more or less covered by the accrescent fleshy calyx; *stone* crustaceous, 1-celled, 1-seeded. *Seed* inverse, albuminous; *embryo* minute, in the apex of albumen; *radicle* superior.—DISTRIB. 25-30 species, natives of the tropics of the Old World.

1. OLAX IMBRICATA, Roxb. Fl. Ind. I, 164. A scandent unarmed

shrub; young branches terete, puberulous when very young. *Leaves* coriaceous, oblong-lanceolate to ovate-oblong, acute, the base rounded or narrowed; both surfaces glabrous, the upper shining, reticulate, the lower dull and the nervation indistinct; main nerves 8 or 9 pairs, faint, spreading; length 3·5 to 5·5 in., breadth 1·25 to 2·75 in., petiole ·2 to ·35 in. *Racemes* about ·5 in. long, many-flowered; the bracts rather large, ovate, concave, imbricate when young, deciduous. *Flowers* about ·5 in. long; petals 6, united in pairs. *Fertile stamens* 3, about as long as the pale staminodes. *Fruit* sub-globose, the apex truncate, ·5 in. in diam., enveloped except at the apex by the accrescent calyx. Wall. Cat. 6775; A. B. Decaisne Nouv. Ann. Mus. III, 438; Miq. Fl. Ind. Bat. I, Pt. I. 785; Hook. fil. Fl. Br. Ind. I. 577; Kurz For. Flora Burma I, 234; Valetton, Olacineæ, 115.

Andaman and Nicobar Islands, Malacca. **DISTRIB:** Java, Phillipines, Burmah, Chittagong.

Although I have not included *O. merguensis*, Planch as a synonym of this, I cannot see how it can be specifically separated. *O. Wightiana*, Wall. also appears to me to resemble this too closely to be kept distinct as a species.

2. *HARMANDIA*, Pierre.

Trees with alternate, simple, entire, petiolate leaves. *Flowers* unisexual, racemose, pedicellate, solitary in the axils of bracteoles. *Calyx* cupular, entire or 4-toothed, greatly enlarged and persistent in the fruit. *Corolla* campanulate or urceolate, fleshy, with 4 short acute valvate lobes (in the female flowers 6-to 8-lobes?) *Disc* short, thin, annular, crenulate, deciduous, embracing the outside of the base of the cylindric staminal tube. *Anthers* 4, sessile, inserted at the mouth of the thick fleshy staminal tube opposite the teeth of the corolla, bilocular, introrse, the apices reflexed, the connective thick. *Pistil* superior, pyramidal, surrounded in the female flower by the barren staminal tube, 1-celled; *stigma* 3-lobed, sessile; *ovules* 2 (usually only 1), short, free, descending from the apex of the short trigonous central placenta. *Drupe* oblong, 1-seeded, surrounded at the base by the large, fleshy, spreading, coloured accrescent calyx; *epicarp* fleshy, *endocarp* ligneous. *Seed* solitary, filling the cavity of the fruit, its testa thin and inseparable from the fleshy albumen; *embryo* minute, excentric, oblique, near the apex of the allumen. *Cotyledons* flat, shorter than the radicle. **DISTRIB.** 2 species; both Malayan.

This genus founded by M. Pierre (Bull. Soc. Linn. Paris, No. 97, p. 770), is remarkable in having a fleshy staminal tube very like that of some *Meliaceæ*, and for the enormous development of the accrescent calyx which forms a large coloured collar round the ripe fruit.

1. *HARMANDIA KUNSTLERI*, King, n. sp. A glabrous tree 30 to 40 feet high; young branches slender, striate. *Leaves* coriaceous, ovate-lanceolate or lanceolate, shortly and bluntly acuminate, the base cuneate; main nerves about 6 pairs, very indistinct on both surfaces; length 2·5 to 3·5 in., breadth 1 to 2 in., petiole ·25 to ·5 in. *Racemes of female flowers* axillary, solitary, not much longer than the petioles. *Flowers* ·15 in. long, solitary in the axils of oblong obtuse bracteoles. *Calyx* flat, spreading, with 4 very obtuse teeth. *Corolla* four times as long as the calyx, urceolate; teeth 4, acute. *Ovary* hidden (except the stigmas) by the barren staminal tube and by the corolla, pyramidal, the style short; 1-celled with a single spuriously erect ovule: *stigma* solitary, capitate. *Fruit* oblong, obtuse, 1·25 in. long, and ·6 in. in diam., surrounded at the base by the greatly enlarged coloured corrugated calyx which forms a frill 3 to 4 in. in diam.

Perak; King's Collector.

A very striking plant. The accrescent calyx forms an enormous waxy collar round the base of the fruit which, at first green, changes into a beautiful flesh-colour, the central part being bluish-black. This species is closely allied to *Harmandia mekongensis*, Pierre (For. Flora Coch. China, t. 264), from which it differs in having an urceolate (not tubular-campanulate) corolla and a larger fruit with the accrescent calyx less invaginated at the base.

3. *OCHANOSTACHYS*, Mast.

Trees or shrubs. *Leaves* alternate, petiolate, penni-nerved. *Flowers* numerous, on long slender branching axillary spikes. *Calyx* cup-shaped, 4-5-toothed, not accrescent. *Petals* 4-5, free, valvate. *Stamens* 12-15, hypogynous, or adherent to the base of the petals; filaments subulate, glabrous; *anthers* 4-celled, opening longitudinally; *staminodes* 0. *Disk* hypogynous, fleshy, very shallow, annular, inconspicuous; *ovary* free, sub-hemispheric, incompletely 3-celled beneath, 1-celled above; *style* short, cylindric; *stigma* minute, terminal, 3-lobed; *ovules* 1 in each cell, pendulous from the apex of a central placenta. *Fruit* drupaceous, 1-celled, 1-seeded.—*DISTRIB.* Species 1 or 2; natives of the Malay Peninsula and Borneo.

1. *OCHANOSTACHYS AMENTACEA*, Mast. in Hook. fil. Fl. Br. Ind. I, 579. A tree 30 to 40 feet high; young branches glabrous, the tips alone puberulous. *Leaves* thinly coriaceous, elliptic-oblong, entire, bluntly sub-acuminate, the base slightly narrowed, both surfaces glabrous; main nerves 5 (rarely 4) pairs, ascending, prominent on the lower, depressed on the upper surface when dry; length 3 to 5 in., breadth 1·5 to 2·5 in., petiole ·5 to ·75 in. *Racemes* as long as or longer

than the leaves, narrow, sometimes branched, axillary, interrupted. *Flowers* on short pedicels with minute ovate, acute bracts at the base; oblong-ovate in bud, less than .1 in. long. *Petals* ovate, glabrous outside with a few coarse hairs inside. *Ovary* vertically striate. *Fruit* ovoid-pyriform, 1.25 in. long, and .8 in. in diam.; the pericarp glabrous, thin, the endocarp bony, with one large cell and a single seed. Valetton, *Olacineæ*, 104. *Petalinia bancana*, Beccari in *Malesia*, I, 257.

In all the provinces except the Andaman and Nicobar Islands. Common.—DISTRIB. Borneo.

This is a very common tree in the Malayan Peninsular where its vernacular name is "Petaling." The same name is applied to it in Borneo, and of this name Beccari's *Petalinia* is an adaptation.

4. BRACEA, nov. gen. King.

Arboreous; *leaves* alternate, simple, entire, petiolate. *Panicles* few-branched, axillary or terminal, nearly as long as or longer than the leaves. *Flowers* hermaphrodite, small, shortly pedicelled, scattered or sub-glomerulate, minutely bracteolate. *Calyx* of 5, free, imbricate, broad, non-acrescent, campanulate sepals. *Petals* 5, hypogynous, slightly united at the base, much imbricate, glabrous. *Stamens* 5, opposite the petals; filaments shorter than the anthers, very broad. *Anthers* ovate, innate, 2-celled, with introrse longitudinal dehiscence. *Staminodes* none. *Ovary* broadly ovate, pyramidal, tapering to the short style, imperfectly 2-celled at the base, 1-celled towards the apex; *stigma* small, 2-lobed. *Ovules* 2, from a short axile basilar placenta. *Fruit* drupaceous, 1-celled, with a single spuriously erect seed.

A genus near *Ochanostachys*, Oliver; but with only 5 stamens, very different in form from those of that genus. I dedicate this to Mr. L. Brace, formerly Curator of the Calcutta Herbarium.

1. BRACEA PANICULATA, n. sp., King. A glabrous tree 50 to 70 feet high; young branches dark-coloured, smooth. *Leaves* coriaceous, ovate to elliptic, sub-acuminate, the base rounded; upper surface shining, the lower dull; main nerves 7 or 8 pairs, curved, spreading, slightly prominent beneath when dry; length 3.5 to 8.5 in., breadth 1.85 to 2.75 in., petiole .65 to .8 in. *Panicles* with few, spreading, spike-like branches. *Flowers* .1 in. long, on pedicels of about the same length, glabrous, the calyx half as long as the corolla; petals and sepals broadly ovate. *Stamens* shorter than the petals, glabrous; *disk* hypogynous. *Fruit* drupaceous, ellipsoid, blunt, glabrous (unripe), .75 in. long, and .4 in. in diam.; the calyx persistent at its base, but not accrescent; *pericarp* fleshy, *endocarp* leathery. *Seed* solitary, attached to the base of the cell.

Perak; Scortechini, No. 288, King's Collector, No. 8086.

5. STROMBOSIA, Blume.

Trees or shrubs. *Leaves* alternate, petioled, simple, penni-nerved. *Inflorescence* shortly cymose. *Flowers* regular, hermaphrodite. *Calyx* a shallow cup, more or less 5-lobed, inferior (partly superior in some species). *Petals* 5, free, hairy within. *Stamens* 5, opposite the petals and adnate to their bases. *Anthers* 2-celled, introrse. *Staminodes* 0. *Ovary* wholly superior, or (in some species) partly inferior, imperfectly 4-5-celled, surrounded by a perigynous lobed disk. *Style* simple. *Ovules* 4-5, pendulous from a central placenta. *Fruit* drupaceous, surmounted by the remains of the calyx-lobes and of the style, stone crustaceous. *Seed* pendulous, embryo minute within fleshy albumen. **DISTRIB.** Species 6, natives of the Western Peninsula, Ceylon and the Malayan Archipelago.

Flowers in pedicelled few-flowered cymes ... 1. *S. javanica*.

Flowers in sessile many-flowered fascicles ...

Leaves ovate to oblong-ovate; petals .2 in.

long ... 2. *S. multiflora*.

Leaves more or less rotund; petals .15 in.

long ... 3. *S. rotundifolia*.

1. STROMBOSIA JAVANICA, Blume Bijdr. 1154. A tree 20 to 50 feet high; young branches rather slender, glabrous. *Leaves* thinly coriaceous, glabrous, oblong to elliptic, shortly acuminate, the base rounded; main nerves 5 or 6 pairs, curved, ascending, slightly prominent beneath; length 4 to 7 in., breadth 1.65 to 2.65 in., petiole .6 to .75 in. *Cymes* axillary, not longer than the petioles, few-flowered; bracteoles small, deciduous, leaving pale scars. *Flowers* ellipsoid in bud, about .2 in. long. *Calyx* nearly flat with 5 short lobes, inferior in the flower; (accrescent and half inferior in the fruit). *Petals* erect, much exceeding the calyx, oblong, obtuse, hairy towards the apex. *Stamens* 5, opposite to, nearly as long as, and adhering to the petals. *Ovary* elongate, tapering into the short style. *Fruit* oblong-ovoid, glabrous, .8 in. long, and .6 in. in diam., the apex crowned by the calyx and disc. Blume Mus. Bot. Lugd. Bat. I, 251; Miq. Fl. Ind. Bat. I, Pt. I, 787; Mast. in Hook. Fl. Br. Ind. I, 579; Kurz For. Flora Burmah, I, 235; Valetton, Olacineæ, 86.

Penang: Wallich. Malacca: Maingay. Perak: King's Collectors.

2. STROMBOSIA MULTIFLORA, King, n. sp. A glabrous tree 50 feet high and upwards; young branches slender, striate, minutely lenticellate, cinereous when dry. *Leaves* coriaceous, ovate to oblong-ovate, acute or shortly acuminate, slightly oblique, rounded at the base, the edges undulate; leaves 5 to 8 pairs, slightly curved, ascending, slightly prominent on the lower, obsolete on the upper, surface; length 2.5 to 4

in., breadth 1·5 to 2 in., petiole ·35 in. *Flowers* in dense axillary fascicles; pedicels shorter than the flowers, each with several rotund, concave, minute bracteoles, one of which is close to the calyx. *Calyx* a shallow cup with 5 broad rounded concave segments. *Petals* ·2 in. long, much longer than the calyx, erect, oblong, obtuse, their apices re-curved, pubescent on the edges and in the upper fourth of the inner surface. *Stamens* opposite the petals to which their filaments are attached for two-thirds of their length; *anthers* short, ovate. *Ovary* sub-globular, grooved, much shorter than the long cylindric style, *stigma* minute. *Fruit* unknown.

Perak: King's Collector, No. 7824. Penang: Curtis, No. 859.

Evidently a *Strombosia*; the fruit, however, is as yet unknown.

3. *STROMBOSIA ROTUNDIFOLIA*, King. A tree or shrub; young branches rather stout; their bark cinereous, rugose, much lenticellate. *Leaves* coriaceous, more or less rotund, glabrous; main nerves 6 or 7 pairs, rather straight, sub-ascending, obsolete on the upper, slightly prominent on the lower surface when dry; length 2·5 in., breadth 2 in.; petiole ·3 in., stout. *Fascicles* small, axillary, few-flowered, shorter than the petioles; pedicels short, each with 2 or 3 minute rotund scale-like bracteoles. *Calyx* cupular, with 5 broad rounded imbricate teeth. *Petals* ·15 in. long, much longer than the calyx, oblong, hairy on the upper half inside, otherwise glabrous; *filaments* adnate to the petals for half their length, *anthers* ovate. *Ovary* sub-globular, *style* cylindric. *Fruit* (*fide* Masters) "the size of a pea, glaucous, globose." *Anacalosa Maingayi*, Mast. in Hook. fil. Br. Ind. I, 580.

Singapore: Maingay (Kew Distrib.), No. 1019.

A species closely allied to *S. multiflora*, King, but with differently shaped leaves. The fascicles of this are fewer-flowered, and the flowers are smaller than in that species. I have seen only Maingay's specimen of this, and there is no fruit on it. Dr. Masters puts this plant into *Anacalosa*, but its petals and anthers are those of *Strombosia*, to which genus I venture to remove it.

6. *CANSJERA*, JUSS.

Climbing shrubs, sometimes spiny. *Leaves* alternate, entire, penninerved. *Flowers* bracteate, in short axillary spikes, monochlamydeous, hermaphrodite. *Perianth* tubular or urceolate, regular, 4- 5-parted, lobes valvate. *Stamens* as many as the lobes of the perianth and opposite to them; filaments glabrous, free, or attached between the fleshy thick lobes of the disk. *Anthers* small, oblong, adnate, 2-celled, dehiscing longitudinally. *Ovary* superior, ovoid-conical, 1-celled. *Style* cylindric; *stigma* capitate, 4-lobed. *Ovule* solitary, erect, or pendulous

from a short placenta. *Fruit* superior, drupaceous, surrounded at the base by the marcescent perianth; sarcocarp thin, endocarp bony. *Seed* solitary, erect, roundish; embryo in the upper part of the fleshy albumen, radicle superior; cotyledons sometimes 3, very long, plano-convex. **DISTRIB.** Species 3–4, natives of Tropical Asia and Australia.

CANSJERA RHEEDII, Gmel. Syst. I, 280. A climbing shrub; the young branches olivaceous, puberulous, sometimes spiny. *Leaves* thinly coriaceous, oblong-lanceolate to ovate, acute or acuminate, the base slightly narrowed, both surfaces glabrous; main nerves 3 to 5 pairs, curved, ascending, faint; length 2·5 to 4 in., breadth 1 to 1·5 in., petiole ·15 in. *Spikes* 1 or 2 from an axil, ·5 to 1 in. long, tomentose; bracteoles minute, linear-lanceolate, one at the base of each flower. *Flowers* ·1 in. long, pubescent externally, apices of the teeth of the perianth re-curved. *Fruit* ovoid, ·4 in. long, glabrous; embryo straight in the axis of copious albumen. Wall. Cat. 1043, B; Wight Ic. t. 1861; Bedd. Flor. Sylvat. Anal. Gen. t. xxvi.; Thwaites Enum. 251; Brandis For. Flor. 75; Hook. fil. Fl. Br. Ind. I, 582; Kurz For. Flora Burma I, 237; Valetton Olacineæ 158. *C. scandens*, Roxb. Cor. Pl. 103; Fl. Ind. i. 441. *C. malabarica*, Lamk. Dict. iii. 433. *C. zizyphifolia*, Griff. Notul. iv. 360, t. 537, f. 1. *C. martabanica*, Wall. Cat. 7266. *Olax*? *sumatrana*, Miq. Fl. Ind. Bat. Suppl. i. 342. *Opilia amentacea*, Roxb. Fl. Ind. I, 86 Wall. Cat. No. 2331, *C. Rheede* Hort. Mal. vii. t. 2, 4. Wall. Cat. *Canscora*, No. 7537.

Andaman and Nicobar Islands: Malacca.—**DISTRIB.** British India, Malayan Archipelago.

I can find no trace of calyx in any of the flowers of this species which I have dissected, and I cannot find that the ovary has more than a single cell. The disc is deeply divided into 4 fleshy acute lobes, between which the stamens are inserted. The fruit is entirely superior. The genus is closely allied to *Champereia*, which has already been transferred by Messrs. Bentham and Hooker to *Santalaceae*. It is also allied to *Lepionurus* and *Opilia*; and, with these, it should, in my opinion, be retransferred to the family *Santalaceae* in which its founder, Jussieu, originally placed it. Wall. Cat. 7537 clearly falls here and not under *Lepionurus sylvestris*. Bl.

7. LEPIONURUS, Blume.

Shrubby. *Leaves* alternate, shortly petioled, simple, penninerved. *Inflorescence* axillary, spicate, with large deciduous bracts, the flowers solitary at the nodes, or in clusters of 3 or 4. *Flowers* monochlamydeous, regular, hermaphrodite. *Perianth* urceolate, the limb 4-parted; lobes valvate, glabrous within. *Stamens* equal in number to

the lobes of the perianth and opposite to them. *Anthers* glabrous. *Staminodes* 0. *Disk* fleshy, yellow, lining the perianth-tube. *Ovary* free, oblong-conical; *stigma* sessile, 4-lobed; *ovule* solitary. *Fruit* drupaceous, glabrous, endocarp crustaceous. *Seed* erect; embryo small, in the axis of fleshy albumen, radicle terete, cotyledons ternate.—DISTRIB. Species 2, natives of Tropical Asia.

LEPIONURUS SYLVESTRIS, Blume Bijdr. 1148. A glabrous shrub; the branches sub-striate, pale when dry. *Leaves* membranous, oblong, elliptic-oblong or elliptic, shortly acuminate, the base cuneate; main nerves 7 to 9 pairs, rather straight, ascending; length 4 to 6·5 in., breadth 1·4 to 3·5 in., petiole ·15 to ·35 in. *Spikes* axillary, ·5 to 1·25 in. long, solitary, or in clusters of 2 to 6, their rachises filiform, at first enveloped by the large ovate acute, membranous, deciduous bracts. *Flowers* long, the tube inflated and lined by the adherent disc; the lobes deltoid, spreading when mature. *Anthers* and filaments broad. *Fruit* ellipsoid to ovoid, ·35 to ·6 in. long when ripe. Blume Mus. Bot. Lugd. Bat. I, 246; Miq. Fl. Ind. Bat., Vol. I, Pt. I, 284; *Lepionurus oblongifolius*, Mast. in Hook. fil. Fl. Br. Ind. 583; Valetou, Olacineæ, 153. *Leptonium oblongifolium*, Griff. in Calc. Journ. IV, 236. *Opilia acuminata*, Wall. Cat. 7206, also Wall. Cat. 7464.

Malacca, Penang, Perak, rather common. DISTRIB.—British India, Burma, Malayan Archipelago.

I have not been able to make out, from dissections of dried specimens, the exact attachment of the ovule. But the ripe seed is unquestionably attached to the base of the cavity of the fruit. Whether the ovule was originally erect, or was attached in a pendulous manner, as some botanists assert, from the apex of a short central placenta, I am unable to say. The genus in my opinion is closely allied to *Cansjera*.

8. CTENOLOPHON, Oliv.

Trees. *Leaves* opposite, petiolate, simple, penni-nerved. *Inflorescence* paniced-cymose. *Flowers* regular, hermaphrodite. *Calyx* 5-parted; lobes imbricate, not accrescent. *Petals* 5, free, imbricate, oblong, reflexed after flowering. *Stamens* 10, free, springing from a short, ring-like, hypogynous disk, those opposite the petals longer than the others; *anthers* roundish, apiculate, 2-celled, dehiscing lengthwise. *Staminodes* 0. *Ovary* free, shortly stalked, imperfectly 2-celled; *style* cylindric, bifid at the apex, stigmas capitate; *ovules* in pairs in each cell, collateral, pendulous. *Fruit* coriaceous or crustaceous, 1-celled, 1-seeded, dehiscing irregularly. *Seed* pendulous from the apex of a free central placenta, and provided with a dorsal pectinate crest.—DISTRIB. 2 known species, both Malayan.

1. Inflorescence pale-tomentose; flowers .2
to .25 in. long ... 1. *C. parvifolius*.
2. Inflorescence rusty-tomentose; flowers
.4 in. long ... 2. *C. grandifolius*.

1. CTENOLOPHON PARVIFOLIUS, Oliver in Trans. Linn. Soc. XXVIII, 516, t. 43. A tree; young branches terete, purplish when fresh, cinereous when dry. *Leaves* opposite, coriaceous, elliptic or oblong-elliptic, entire, shortly and obtusely acuminate, the base cuneate or rounded; upper surface shining, the lower dull, both glabrous; main nerves about 10 pairs, faint, spreading, forming a double series of arches within the edge; length 2.5 to 4.5 in., breadth 1.25 to 2 in., petiole .3 to .5 in. *Panicles* terminal and axillary, shorter than the leaves, condensed, minutely cano-tomentose; bracts ovoid-deltoid, minute, deciduous; pedicels stout, about as long as the calyx. *Flowers* .2 to .25 in. long, oblong. *Calyx-lobes* sub-rotund, concave, minutely tomentose outside, sub-glabrous inside. *Petals* coriaceous, erect, oblong, concave, four times as long as the calyx, minutely pale tomentose on the back, the imbricate edges and inner surface glabrous. *Anthers* ovate, adnate, much shorter than the filaments. *Ovary* ovoid-globose, woolly, 2-celled, surrounded at the base by an annular disc: *style* long, cylindric, glabrous, 2-furrowed. *Fruit* ellipsoid, slightly obovoid, apiculate, striate, .6 to .75 in. long, minutely pale tomentose; the pericarp woody, splitting on one side when ripe. *Seeds* with an imperfect pectinate arillus. Masters in Hook. fil. Fl. Br. Ind. I, 579: Beccari, Malesia I, 120.

Malacca: Maingay (Kew Distrib.), No. 382. Perak: Scortechini, Wray, King's Collector.—DISTRIB. Borneo, Beccari, P. B., No. 2637, (*fide* Beccari). Sumatra: Forbes, 3002.

2. CTENOLOPHON GRANDIFOLIUS, Oliver in Trans. Linn. Soc. XXVIII, 517, t. 43, figs. 8 to 10. A tree; the young branches pale, sparsely lenticellate. *Leaves* oblong-elliptic, shortly acuminate, 3.5 to 5 in. long and 1.5 to 1.75 in. broad, otherwise as in *C. parvifolius*. *Panicles* terminal or axillary, almost as long as the leaves, more or less open and spreading, minutely rusty-tomentose; bracts scale-like, caducous; pedicels longer than the calyx. *Flowers* .4 in. long. *Calyx* and *petals* as in *C. parvifolius*, but rufous- instead of pale-tomentose. *Ovary* as in *C. parvifolius*, but the ovarian cavity shorter. *Fruit* unknown. Masters in Hook. fil. Fl. Br. Ind. I, 577. Beccari, Malesia I, 120.

Malacca: Maingay (Kew Distrib.), No. 383.—DISTRIB. Borneo. P. B., No. 1966 (*fide* Beccari).

This species is much rarer than the last. In fact I have seen no other specimens than Maingay's. It closely resembles *C. parvifolius* Oliver, the only tangible differences that I can discover (in the absence

of fruit of this), being the greater size of its flowers, and the colour of the tomentum of the flowers and inflorescence which in this is rusty, whereas in *C. parvifolius* it is pale. Professor Oliver relies as a diagnostic mark on a difference in the length of the ovarian cavity; the cavity of the ovary in *C. parvifolius* reaching nearly to the base of the style, whereas in *C. grandifolius* it occupies the base only of the ovary.

9. XIMENIA, Linn.

A shrub or low tree. *Branches* spiny. *Leaves* shortly petioled, alternate, simple, 1-nerved. *Flowers* racemose, usually hermaphrodite. *Calyx* cupular, 4-5-toothed, persistent, not accrescent. *Petals* 4-5, oblong, revolute, hairy within. *Stamens* twice as many as the petals, hypogynous; *anthers* innate, linear, 2-celled. *Staminodes* 0. *Ovary* sessile, superior, 4-celled; *style* columnar, stigma simple; *ovules* solitary in each cell, pendulous, anatropous. *Drupe* ovoid, 1-celled; *stone* solitary.—DISTRIB. Species, 4-5, 1 Mexican, 1 South African, 1 Bornean, 1 Polynesian, 1 widely dispersed through the Tropics of both hemispheres.

1. XIMENIA AMERICANA, Linn. Sp. Pl. 1193. Glabrous, the young shoots striate and lenticellate. *Leaves* coriaceous, oblong-ovate to sub-orbicular, the apex emarginate, the base rounded; length 1 to 2 in., breadth .75 to 1.25 in. *Racemes* short, axillary, or at the ends of short branches, few-flowered. *Flowers* hermaphrodite or polygamous, .35 in. long; the buds oblong, acute, bracts minute. *Calyx* much shorter than the petals. *Anthers* linear, erect, the connective thick. *Ovary* ovoid-conical, glabrous. *Style* as long as the stamens. *Stigma* simple. *Fruit* oval, glabrous, about 1 in. long, orange-red when ripe, the pericarp pulpy; *endocarp* bony, 1-celled, 1-seeded. Lamk. Illust. 297, fig. 1; DC. Prod. I, 533; Roxb. Fl. Ind. II, 252; W. and A. Prod. 89; Blume Mus. Bot. Lugd. Bat. I, 247; Miq. Fl. Ind. Bat. I, Pt. 1, 786; Hook. fil. Fl. Br. Ind. I, 574; Pierre For. Flor. Coch. China, x. 265; Kurz For. Flora Burma I, 233; Valetton Olacineæ, 74. *X. Russelliana*, Wall. Cat. 6784.

Malacca, Singapore, Nicobar and Andaman Islands :—DISTRIB. Malayan Archipelago; Peninsular India.

10. SCORODOCARPUS, Beccari.

A tall tree. *Leaves* alternate, simple, penni-nerved. *Flowers* dichlamydeous, in short axillary racemes. *Calyx* small, cupular, 4-crenate, not enlarging with the fruit. *Petals* 4 or 5, hypogynous, narrow, valvate, coherent by their edges until mature, lanate internally. *Stamens* twice as many as the petals, attached to them in pairs, dehiscing suturally, the filaments shorter than the linear elongate erect anthers.

Ovary ovoid, grooved, imperfectly 4- or 5-celled, with 4 or 5 elongated pendulous ovules. *Style* simple, much longer than the ovary; *stigma* minutely-lobed, terminal. *Fruit* globose, 1-celled, the epicarp thin, fleshy, the endocarp crustaceous. *Seed* solitary, globular, pendulous from the apex by a filiform thread (? placenta), embryo near the apex of the fleshy albumen, radicle superior. One species; native of Malaya.

1. SCORODOCARPUS BORNEENSIS, Beccari in Nuovo Giorn. Bot. Ital. IX, 273. A tall very foetid tree; branches dark-coloured, lenticellate. *Leaves* coriaceous, elliptic-oblong, acute, the base slightly cuneate or rounded; both surfaces glabrous, the reticulations transverse; main nerves about 5 pairs, curved, ascending, prominent beneath; length 5 to 6·5 in., breadth 2·5 to 3 in., petiole about ·75 in. *Racemes* under 2 in. long, puberulous, the flowers in clusters of 3 or 4. *Calyx* with wavy edge, nearly glabrous. *Buds* oblong; petals puberulous outside, ·3 to ·35 in. long. *Disc* 0. *Fruit* glabrous, 2 in. in diam. Valetton Olacineæ, 88. *Schmidelia foetidissima*, Wall. Cat. 8064. *Ximinia borneensis*, Baillon Adansonia LXI. 271 (in part).

Singapore: Wallich, Ridley, King. Johore: Ridley. Perak: King's Collector.—DISTRIB. Borneo.

Rather a common tree, every part of which has a foetid alliaceous odour. The wood is hard and durable, and is much prized for various purposes. This tree was collected by Wallich in Singapore, and he referred it to *Schmidelia*. The Wallichian specimens, however, were overlooked, and the plant was first described by Baillon from specimens collected by Signor Beccari in Borneo. Subsequently the latter Botanist founded for its reception, the genus *Scorodocarpus*. Its affinities are with *Ximenia*.

11. ANACOLOSA, Blume.

Shrubs or trees. *Leaves* alternate, petiolate, simple, penni-nerved. *Inflorescence* cymose, axillary. *Calyx* cup-shaped, 5-7-toothed, not accrescent. *Petals* 5-7, oblong, free, valvate, springing with the stamens from a hypogynous or perigynous disk. *Stamens* concealed in the cavity of the petals and slightly adnate to their bases, filaments glabrous, or pilose at the apex; *anthers* broad, innate, 2-celled, dehiscing longitudinally. *Ovary* imperfectly 2- 3-celled below, 1-celled above; *style* cylindric, the stigma shortly lobed; *ovules* 2 or 3, pendulous, the placenta central. *Fruit* drupe-like, with the disc persistent at its apex and the slightly accrescent calyx at its base; *stone* crustaceous, 1- or imperfectly 2-celled, with a single pendulous seed; *embryo* minute at the apex of fleshy albumen, radicle superior.—DISTRIB. 5 or 6 species, British Indian and Malayan.

Calyx and pedicels glabrous ... 1. *A. Griffithii*.

Calyx and pedicels minutely rusty-pubescent

Leaves membranous; young branches
glabrous, dark-coloured; anthers with a
tuft of hairs in front ... 2. *A. puberula*.

Leaves coriaceous; young branches thick
with pale scurfy bark; anthers very
hairy ... 3. *A. heptandra*.

1. ANACOLOSA GRIFFITHII, Masters in Hook. fl. Fl. Br. Ind. I, 580.
A glabrous shrub or tree; young branches dark-coloured, glaucous.
Leaves thickly membranous, ovate-lanceolate, sub-acute or acute, the
base rounded or sub-cuneate; main nerves 5 or 6 pairs, obscure on both
surfaces, curved, spreading; length 2·5 to 4 in., breadth 1·2 to 1·5 in.,
petiole ·35 in. *Cymes* axillary, few-flowered, sessile or very shortly
pedunculate; pedicels longer than the flowers, angled, ebracteolate,
glabrous. *Flower-buds* sub-globose. *Calyx* cupular, minutely 5-or 6-
toothed, glabrous. *Petals* two or three times longer than the calyx,
oblong, obtuse, the upper half thick and fleshy, the lower half concave,
hairy towards its upper part, otherwise glabrous. *Stamens* embedded in
the concavities of the petals, the filaments short, slender; the anthers sub-
globular, hairy in front. *Ovary* conical, flocculent-hairy, tapering into
the glabrous style, surrounded at the base by the annular fleshy disk.
Kurz For. Flora Burma I, 236; Valetton Olacineæ, 92; Pierre For.
Flor. Coch. Chine, t. 266 B.

Burma: doubtfully in the Andaman Islands.

I have seen no specimen of this from the Andamans, but I include
it on the authority of the Flora of British India.

2. ANACOLOSA PUBERULA, Kurz in Jour. As. Soc. Bengal, 1872, Pt. 2,
p. 297. A large shrub; young branches glabrous, dark-coloured, all
parts except the inflorescence glabrous. *Leaves* membranous, oblong-
lanceolate, the apex more or less acute, the base slightly narrowed;
main nerves 3 to 5 pairs, distant, ascending, pale and prominent on the
lower, faint on the upper surface; length 3·5 to 5·5 in., breadth 1·5 to
2 in., petiole ·3 in. *Cymes* few- or many-flowered, axillary, about as long
as the petioles, their rachises conical, woody: pedicels ebracteolate.
Calyx cupular, with 6 minute distant teeth, rusty-pubescent outside like
the pedicels. *Petals* 6, in pairs, oblong, the upper half fleshy; the
lower half concave, glabrescent externally, glabrous internally except
for a tuft of long hairs at the apex of the concavity. *Stamens* opposite
to and as many as the petals, hidden in their concavities; the filaments
shorter than the anthers, broad, flat; *anthers* broadly ovoid, tufted,
hairy; *disc* large, crenulate, surrounding the base of the conical sub-

glabrous ovary; *stigma* small, minutely lobed. *Fruit* ovoid, glabrescent, .6 in. long, with the persistent disc at its apex and the slightly accrescent calyx at its base. Kurz For. Flora Burma I, 235: Valeton Olacineæ 93.

Nicobar Islands, Kurz.

Var. *Andamanica*. Leaves ovate-elliptic or ovate-lanceolate, main nerves 4 to 6 pairs, spreading, not pale underneath.

Andaman Islands: King's Collectors.

The specimens on which Kurz founded this species are in the Calcutta Herbarium. They were collected in the Nicobar Islands although Kurz, by a slip, attributes them to the Andamans. These Nicobar specimens are distinguished from all which have, since Kurz's time, been collected in the Andamans (where the plant is very common) by the smaller number of nerves in the leaves, which are, moreover, ascending and pale beneath, whereas these from the Andamans have more numerous nerves which are spreading and are not pale beneath.

3. ANACOLOSA HEPTANDRA, Maing. MSS. ex Hook. Fl. Ind. I, 581. A shrub or tree; young branches stout, with pale scurfy bark. *Leaves* coriaceous, oblong-lanceolate, sub-acute at base and apex, glabrous; main nerves 5 or 6 pairs, ascending, obsolete on the upper, rather prominent on the lower surface; length 6 or 7 in., breadth 2.25 to 3 in., petiole .3 in. *Flowers* in crowded axillary cymes not much exceeding the petioles; *pedicels* short, rufous-pubescent like the calyx, ebracteolate. *Calyx* cupular, with 6 minute distant teeth. The other parts of the Flower as in *A. puberula*, but the ovary narrower, and the anthers more hairy, not merely tufted with hairs. Valeton Olacineæ, 93.

Malacca; Maingay (Kew Distrib.), No. 368.

This species of which I have seen only two specimens (neither of which is in fruit) comes very near to *A. puberula*. The young branches however, are thicker, with paler bark, and have the anthers more hairy than in that species.

12. PLATEA, Blume.

Trees. *Leaves* entire, coriaceous. *Male flowers* in short axillary interrupted-glomerulose spikes; the females in shorter cymes. *Flowers* polygamo-dicæious. *Sepals* 5, distinct, imbricate, small. *Petals* 5, united below into a tube, the teeth valvate; in the female deciduous or absent. *Stamens* 5, alternate with the petals and inserted at their bases; the filaments short, *anthers* ovoid, 2-celled. *Ovary in the female flower* cylindric, oblong, obtuse, crowned by the large discoid stigma, 1-celled; the ovules 2, pendulous. *Drupe* baccate, the endocarp woody.

Seed pendulous, the embryo straight, in the axis of the copious albumen.—DISTRIB. about 4 species; all Malayan.

1. *PLATEA EXCELSA*, Blume Bijdr. 646. A tree 50 to 100 feet high; young branches slender, softly rusty-puberulous. *Leaves* thinly coriaceous, elliptic to oblong, acute or shortly acuminate, the base rounded or very slightly narrowed; upper surface sparsely rufous, puberulous at first, afterwards almost glabrous; lower minutely cinereous-lepidote; reticulations minute, rather distinct and puberulous on both surfaces; main nerves about 7 pairs, spreading, curved, puberulous; length 4·5 to 7 in., breadth 1·75 to 3·5 in., petiole ·5 to ·75 in. *Female flowers* in axillary, 7-or 8 flowered, shortly pedunculate, pubescent, axillary cymes ·5 in. long. *Sepals* ·5 in., broadly ovate, acute, pubescent externally. *Petals* none or early deciduous. *Ovary* cylindric, puberulous; *ovule* (only 1 seen) pendulous, much elongate. *Fruit* narrowly ovoid-ellipsoid, tapering much to the apex, the base rounded 1 to 1·3 in. long, and ·5 in. in diam.; when ripe the pericarp yellowish, thin, glabrous; *endocarp* bony with a few short furrows, *seed* much attenuate at the upper end. Miq. Fl. Ind. Bat. I, pt. 1, 793: Beccari Malesia I, 116: Valetton Olacineæ, 253.

Perak: King's Collector, Wray. Penang: King's Collector, No. 1302. DISTRIB.—Java.

13. *GOMPHANDRA*, Wall.

Shrubs or trees. *Leaves* alternate, petioled, simple, penni-nerved, (rarely triple-nerved at the base). *Flowers* polygamo-dioecious, cymose, (practically unisexual). *Calyx* minute, cupular, 4-5-toothed. *Petals* 4 or 5, sometimes united and 4-or 5-cleft; often absent in the female flower. *Stamens* 4 or 5, hypogynous, alternate with the petals; *filaments* thick, flattened, hollowed in front, and attenuate at the apex; *anthers* rather small, pendulous from the apices of the filaments, 2-lobed, the dehiscence longitudinal. *Hypogynous disc* thick, annular, or absent. *Male flower* with rudimentary ovary sunk in the fleshy disc, the stigma minute. *Female flower* with long cylindric ovary and large discoid stigma, 1-celled (2-celled in two species), the ovules 2, collateral, pendulous from the apex, the funicle dilated. *Fruit* elongate, drupe-like, surmounted by the remains of the stigma; *pericarp* smooth, thin, *endocarp* leathery. *Seed* solitary, pendulous; *albumen* fleshy, bi-par-tite; *embryo* minute.—DISTRIB. 8 or 10 species; Tropics of Asia.

Flowers 4-merous.

Filaments with a large tuft of long white

glandular hairs on both surfaces near the

apex

...

...

...

1. *G. comosa*.

Filaments with a few white hairs on the posterior surface.

Cymes axillary or terminal ... 2. *G. lanceolata*.

Cymes extra-axillary or leaf-opposed ... 3. *G. penangiana*.

Flowers 5-merous.

Filaments hairy near the apex.

Cymes on stout short peduncles, ovary hairy, fruit .8 in. long ... 4. *G. nyssifolia*.

Cymes on slender peduncles, ovary glabrous

Pedicels of cymes less than half the length of the leaves; fruit .25 to .5 in. long ... 5. *G. Maingayi*.

Pedicels of cymes half as long as the leaves; fruit .65 in. long, imperfectly 2-celled ... 6. *G. gracilis*.

Filaments quite glabrous ... 7. *G. andamanica*.

1. *GOMPHANDRA COMOSA*, King, n. sp. A glabrous tree or shrub, young branches cinereous. *Leaves* thinly coriaceous, oblong to elliptic-oblong, shortly acuminate, much narrowed at the base; main nerves 6 to 8 pairs, sub-ascending, faint; length 3.5 to 6 in., breadth 1.5 to 2 in., petiole .35 to .6 in. *Cymes* on slender pedicels about as long as the petioles, umbellulate; cymules 3 to 5, each with 2 to 3 flowers. *Flowers* sessile, .2 in. long, the buds obovate-globose. *Calyx* shallow, the edge wavy and obscurely 4- or 5-toothed. *Petals* 4, four or five times longer than the calyx, broadly oblong, obtuse, with an inflexed sub-apical point, glabrous. Connective and upper part of filament densely covered with long, white, glandular-pointed hairs. *Ovary* short, ovoid, conic, immersed in the fleshy annular disk, *style* short. *Fruit* narrowly ellipsoid, glabrous, vertically grooved, 1 in. long, and .4 in. in diam., epicarp thin, endocarp cartilaginous, one-celled, 1-seeded.

S. Andaman; King's Collector's.—DISTRIB. Java.

The hairs on the filaments are white and very numerous, and they have conspicuous glandular apices. The ovary above described is that found in flowers bearing perfect anthers. It is probable that it aborts, and that fertile ovaries are confined to flowers (as yet undiscovered) in which the stamens are imperfect.

2. *GOMPHANDRA LANCEOLATA*, King. A shrub 5 or 6 feet high; young branches thin, puberulous. *Leaves* sub-coriaceous, lanceolate or oblong-lanceolate, sometimes very narrow, acuminate, the base cuneate; upper surface glabrous, the lower sparsely puberulous; main nerves about 5 pairs, spreading; the tips ascending, faint; length 2 to 6 in.,

breadth $\cdot 4$ to $1\cdot 5$ in., petiole $\cdot 15$ to $\cdot 3$ in. *Cymes* axillary and terminal, their pedicels several times as long as the petioles, usually 3, trichotomous; the cymules 3- to 10-flowered, pubescent or glabrescent. *Flowers* sessile, $\cdot 15$ in. long, buds clavate with truncate apices. *Calyx* cupular, with 3 or 4 small obscure teeth. *Petals and stamens of the male flowers and female flowers* as in *G. penangiana*. *Lasianthera lanceolata*, Mast. in Hook. fil. Fl. Br. Ind. I, 585. *Stemonurus tomentella*, Valetton (not of Beccari) *Olacineæ*, 237.

Malacca: on Mount Ophir, Griffith. Perak: King's Collector, Wray, Scortechini, common.

This is rather a variable species as regards the form of leaf and the amount of pubescence on the inflorescence, but the characters of the flowers are constant. For two of the best-marked of these forms I propose varietal names as below.

Var. *angustifolia*, King: *leaves* narrowly oblong-lanceolate, 2 to 6 in. long, and $\cdot 4$ to $\cdot 7$ in. broad: *fruit* ovoid with a long apiculus, also contracted at the base, $\cdot 5$ in. long. Wall. Cat. *Olacineæ*, No. 7570.

Singapore, Wallich. Penang, Curtis, Nos. 737 and 1265. Perak: Scortechini, King's Collector, No. 4211.

Var. *triplinervis*, the two lower lateral main nerves bold and continued nearly to the apex of the leaf.

Perak; Scortechini, No. 375.

3. GOMPHANDRA PENANGIANA, Wall. Cat. 7204. A glabrous or subglabrous shrub 3 to 8 feet high; young shoots thin, pale. *Leaves* shortly membranous, oblong, oblong-lanceolate or elliptic, shortly acuminate, the base cuneate; main nerves 5 to 9 pairs, spreading or ascending, slightly prominent; length $4\cdot 5$ to 7 in., breadth $1\cdot 5$ to $2\cdot 75$ in., petiole $\cdot 25$ to $\cdot 35$ in. *Cymes* extra-axillary or leaf-opposed, pubescent, trichotomous, spreading, many-flowered, their peduncles longer than the petioles, erect. *Flowers* $\cdot 15$ in. long, on short glabrous or pubescent pedicels. *Calyx* a shallow glabrous cup with 3 or 4 obscure broad teeth. *Corolla* in bud cylindric-clavate, the apex truncate, four or five times as long as the calyx, glabrous. *Petals* 4, oblanceolate (the apex inflexed), hyaline. *Filaments* flat, thick, tapering to each end, with a tuft of few long pale glandular hairs near the apex behind the insertion of the anther. *Rudimentary ovary* narrowly ovate, small, half-immersed in the deep fleshy lobed disk. *Cymes of female flowers* longer than the males, secund; *calyx* as in the male: *corolla* absent. *Ovary* elongate, cylindric, glabrous, crowned by a large discoid *stigma* wider than itself, one-celled with 2 elongated ovules pendulous from the apex. *Fruit* ovoid or elliptic, constricted at base and apex, vertically ridged, glabrous, crowned by the persistent stigma, $\cdot 5$ to $\cdot 7$ in. long. Masters in

Hook. fil. Fl. Br. Ind. I, 587. *Stemonurus penangianus*, Miers Contrib. I, 90; Kurz For. Flor. Burm. I, 238. Wall. Cat. 3718. *G. axillaris* (in part).

Penang; Wallich, Curtis. Perak; Scortechini, King's Collector, Wray; very common.

4. GOMPHANDRA NYSSIFOLIA, King. A tree 15 to 40 feet high; young branches dark-coloured, slightly winged under the nodes. *Leaves* coriaceous, elliptic-ovate, abruptly and shortly acuminate, the base cuneate; main nerves rather straight, ascending, prominent on the lower surface, the transverse veins distinct, ovary sub-horizontal; length 3·5 to 5·5 in., breadth 2 to 2·5 in., petiole ·3 in. *Cymes* axillary, sometimes 2 together, their pedicels shorter than or as long as the petioles; flowers 4 to 6, sessile, ·25 in. long. *Female flower*: calyx cupular, with 5 minute distant teeth or sub-entire; *petals* 5, puberulous outside, 5 or 6 times as long as the calyx. *Filaments* flat, with a few white short hairs just below the anther, especially in front. *Disk* adherent to the base of the ovary, glabrous. *Ovary* cylindric, as long as the petals, puberulous, crowned by the large discoid lobed stigma. *Fruit* ellipsoid, slightly clavate, glabrous, ridged, crowned by the persistent stigma, ·8 in. long, and ·35 in. in diam.

Perak: Scortechini, King's Collector, Nos. 6406 and 6984.

I have not seen the true male flowers of this species.

5. GOMPHANDRA MAINGAYI, King. A glabrous shrub 4 to 6 feet high; young branches rather stout, dark-coloured, glabrous. *Leaves* sub-coriaceous, oblong-lanceolate and acuminate, or sub-rhomboidal acute, the base cuneate; main nerves 5 or 6 pairs, rather straight, ascending, prominent beneath; length 2 to 3·5 in., breadth ·9 to 1·2 in., petiole ·25 in. *Peduncles* longer than the petiole, slender; *cymules* 2 or 3, umbellulate, each 4- to 5-flowered. *Flowers* ·15 in. long, sessile. *Calyx* cupular, tomentose, with 4 or 5 shallow teeth. *Petals* 5, four or five times as long as the calyx, rather thick, oblong, sub-acuminate, the apex inflexed, the midrib dark. *Filaments* pointed at the apex and with small tufts of long white sub-apical hairs; *anthers* pendulous from the apex of the filaments. *Rudimentary ovary* and disk absent. *Female flower* unknown. *Fruit* (*fide* Masters) ovoid, ·25 to ·5 in. long, 1-celled, 1-seeded. *Stemonurus Maingayi*, Valetton Olacineæ, 236. *Lasianthera Maingayi*, Mast. in Hook. Fl. Br. Ind. I, 585.

Malacca: Maingay (Kew Distrib.), No. 374². Penang: Curtis.

Known only by Maingay's and Curtis's scanty specimens. It is possible that under these there may really be two species: for Maingay's specimens divide themselves into two sets; one with sub-rhomboid acute leaves which bear the flowers described above; the other with narrowly

oblong-lanceolate leaves and which have neither flowers nor fruit. It is possible that the second set belong to an undescribed species.

6. *GOMPHANDRA GRACILIS*, King, n. sp. A glabrous shrub or small tree; young branches thin, pale. *Leaves* membranous, lanceolate or ovate-lanceolate, acuminate, the base much narrowed, the edges slightly recurved when dry, wavy and sub-crenulate; main nerves 6 or 7 pairs, spreading, faint. *Peduncles* axillary and terminal, nearly half as long as the leaves; the cymes trichotomous, compound, the ultimate cymules umbellate. *Male flowers* .1 in. long, the buds sub-globular; *Calyx* cupular, shallow, with 5 minute teeth; *petals* 5, oblong, glabrous, reflexed, 4 or 5 or 6 times as long as the calyx. *Filaments* 5, thin, flat, attenuate upwards, bearing a tuft of white bulbous-pointed hairs below the small anther. *Female flower* with calyx and abortive stamens like the male, the petals (if any) deciduous. *Ovary* long, cylindric, glabrous, crowned by the large pileate stigma, 2-celled, one of the cells usually empty, the other with a single long ovule suspended from its apex. *Fruit* ellipsoid, flat on one side, curved, glabrous, striate, about .65 in. long, imperfectly 2-celled and with a single pendulous seed.

Perak: Wray, King's Collector; common.

A species readily distinguished by its small flowers globular in bud, and by its curved imperfectly 2-celled fruit.

7. *GOMPHANDRA ANDAMANICA*, King. A tree; young branches tawny-puberulous. *Leaves* thinly coriaceous, oblong or elliptic, shortly and rather abruptly acuminate, the base round or narrowed, sometimes oblique; main nerves 8 or 9 pairs, curved, ascending, prominent beneath and depressed above when dry; length 5 to 8 in., breadth 2 to 3 in., petiole .4 to .6 in. *Cymes* in the axils of leaves or of fallen leaves, often 2 together, .5 to .8 in. in diam., many-flowered, dense, rusty-pubescent, their peduncles stout and .4 or .5 in. long. *Flowers* nearly .15 in. long, sessile, globose-obovate in bud. *Calyx* cupular, thin, irregularly and minutely 4-5-toothed, tomentose externally, and glabrous internally like the petals. *Petals* 5, oblong-ob lanceolate, spreading, the apices curved, three times as long as the calyx. **MALE FLOWERS:** *stamens* 5, as long as the petals, free, the filaments quite glabrous; *disk* hypogynous, fleshy, embracing the base of the narrowly ovoid small rudimentary ovary. *Female flower:* calyx as in the male; petals and stamens not seen; *ovary* narrowly ellipsoid, with a short constriction at the apex, stigma disciform. *Fruit* compressed-ellipsoid, about 1 in. long, slightly convex on one side, deeply grooved on the other; the pericarp glabrous, vertically striate, thin; the endocarp leathery, 2-celled, one cell without a seed, and divided by vertical false dissepiments into several chambers, the other cell occupied by a single pendulous flat seed

bent vertically on itself at right angles. *Apodytes andamanica*, Kurz, Journ. As. Soc. Bengal, 1872, II, 296; Hook. fil. Fl. Br. Ind. I, 587.

Andaman and Nicobar Islands; Kurz. Narcondam Island; Prain.

This species was published as an *Apodytes* by Kurz. The stamens ovary and fruit however are exactly those of *Gomphandra*, to which genus I therefore transfer it. In *Apodytes* the stamens have long narrow anthers and short filaments, while the style is oblique and ex-centric, more or less curved, and the stigma small, the fruit being more or less orbicular or reniform with the scar of the stigma lateral.

14. LASIANTHERA, Pal. de Beauv.

Trees or shrubs, sometimes scandent. *Leaves* alternate, simple, penni-nerved, coriaceous. *Flowers* dichlamydeous, bisexual, in stalked axillary cymes. *Calyx* minute, cupular, 4- or 5-lobed. *Petals* 5, free or rarely cohering, the apex inflexed. *Stamens* 5, hypogynous, free, alternate with the petals; the filaments flat, broad, the connective dilated behind and bearing a tuft of long hairs curving over the anther in the bud; *anthers* adnate, 2-lobed, dehiscing lengthwise. *Hypogynous disk* cup-shaped, more or less corrugated. *Ovary* ovoid, 1-celled, tapering into a subulate style, terminated by a minute stigma; *ovules* 2, pendulous. *Fruit* drupaceous; *stone* fibrous outside, woody within. *Seed* pendulous; *embryo* in albumen, cotyledons leafy and broad, radicle superior.—DISTRIB. Species 4, one African, the others Malayan.

The genus *Stemonurus*, as originally constituted by Blume in 1825, contained three species. One of these has been referred by Messrs. Bentham and Hooker to the older genus *Lasianthera*, which was founded by Palisot-Beauvois in 1805; while the other two species of Blume, viz., *S. parviflorus* and *S. javanica*, have been placed in the genus *Gomphandra* Wall. as defined by Lindley (Nat. Syst. Ed. II, p. 439).

This arrangement is not, however, accepted by all botanists who have written concerning these genera. Miers (Contrib. I, 80) for example considers *Gomphandra* Wall. and *Stemonurus*, Bl. as identical, and both as undistinguishable from *Lasianthera*, Pal-Beauv.; while Beccari (Malesia I, pp. 107, et seq.) keeps up all three genera, and in this, he is followed by Valetton (Olacineæ pp. 207, et seq.). M. Baillon, like Miers, includes the other two in *Lasiandra* which however he places in the natural family *Terebinthaceæ*. Dr. Masters (in Hooker's Flora of British India) follows Messrs. Hooker and Bentham, and I do so also. I have, however, modified the generic characters of *Lasianthera* and *Gomphandra*, and I have not followed Dr. Masters altogether in his allocation of the species. I find the best characters to distinguish *Gomphandra* from *Lasianthera* to be these:—*Lasianthera*, flowers truly hermaphrodite, stigma minute,—*Gomphandra* flowers practically unisexual, the stameniferous flowers having rudimentary ovaries and the seed-producing flowers having large cylindric ovaries with large discoid stigmas, and usually abortive stamens.

Ultimate branches of the inflorescence scor-
poid cymules 1·5 in. or more in length ... 1. *L. secundiflora*.

Ultimate branches of the inflorescence about
·25 in. long.

Leaves cuneate-obovate 2. *L. umbellata*.

Leaves elliptic-oblong or elliptic-acu-
minate 3. *L. malaccensis*.

1. *LASIANThERA SECUNDIFLORA*, Miq. Fl. Ind. Bat. I, Pt. I, 792; Suppl. 342, t. 2, pp. 43 and 403. A glabrous tree 40 to 60 feet high; young branches stout, dark-coloured. *Leaves* coriaceous, elliptic or ovate-elliptic, very shortly and bluntly acuminate or obtuse, the base rounded or narrowed; the midrib prominent on the lower surface, depressed on the upper; main nerves about 10 pairs, ascending, curving slightly, not much more prominent when dry than the secondary nerves and wide reticulations; length 5 to 10 in., breadth 2·25 to 4 in.; petiole ·5 to ·75 in., stout. *Peduncles* solitary, longer than the petioles, woody, each bearing at its apex an umbel of 6- to 9-flowered secund subscorpioid cymes. *Flowers* sessile, ebracteate, ·25 in. long. *Calyx* short, puberulous. *Petals* glabrous, four or five times as long as the calyx, oblong, sub-acute, each bearing a fleshy conical inflected process slightly below the apex. *Filaments* flattened, tapering to the base; the connective thick, bearing a dense tuft of white hairs as long as the stamen. *Ovary* furrowed, shorter than the stamens but longer than the style. *Fruit* narrowly ellipsoid, 2·5 in. long, and 1 in. in diam., tapering to each end, glabrous, vertically grooved; epicarp thin, mesocarp fibrous, endocarp thin and bony; embryo half as large as the albumen, cotyledons foliaceous, cordate, radicle superior. *Stemonurus secundiflorus*, Blume Bijdr. 649; Mus. Bot. Lugd. Bat. I, t. XLV; Beccari, Malesia, Vol. I, t. IV, figs. 16 and 17; Valetton, Olacinae 234.

Singapore, Johore: Ridley. Perak: King's Collector, Wray.
DISTRIB.—Java, Sumatra.

2. *LASIANThERA UMBELLATA*, King. A glabrous tree 50 to 60 feet high (or a shrub *vide* Beccari); young branches cinereous, terete. *Leaves* coriaceous, cuneate-obovate, the apex rounded or slightly retuse, much narrowed to the base, midrib prominent beneath; main nerves 7 to 9 pairs, ascending, faint; length 2·5 to 3·5 in., breadth 1·25 to 1·8 in., petiole ·5 to ·7 in. *Cymes* longer than the petioles, umbellulate; the 4 to 6 cymules each with 4 or 5 flowers. *Flowers* sessile, ·15 in. long, broad, truncate. *Calyx* nearly half as long as the petals, pubescent, coriaceous, the edge with 5 broad rounded teeth. *Petals* subcoriaceous, elliptic, obtuse at each end and with an inflexed process below the apex, puberulous outside, glabrous inside. *Filaments* attenuated

towards the base. Connective of anthers everywhere densely silky-comose, the anther lobes separated. *Ovary* globose-ovoid, tapering into the short style, 1-celled. *Disk* thin, hyaline, enveloping the base only of the ovary. *Fruit* unknown. *Stemonurus umbellatus*, Beccari, Malesia, I, 115; tav. XV, pp. 5, 6. *Stemonurus intermedius*, Scort. MSS. in Herb. Calc.

Perak: King's Collector, Scortechini.—DISTRIB. Borneo.

3. LASIANTHERA MALACCENSIS, Mast. in Hook. fil. Fl. Br. Ind. I, 584. A glabrous tree 30 to 40 feet high; young branches cinereous, terete, glabrous. *Leaves* coriaceous, elliptic-oblong to elliptic, shortly and abruptly acuminate, the base narrowed, midrib prominent on the upper, depressed on the lower surface; main nerves about 10 pairs, straight, sub-ascending, faint on both surfaces; length 3 to 4·5 in., breadth 1·2 to 2·25 in., petiole ·3 or ·4 in. *Cymes* slightly longer than the petioles, dichotomous, 8- to 10-flowered. *Flowers* sessile, ebracteate, 2 in. long. *Calyx* with 5 acute teeth, puberulous. *Petals* 3 or 4 times as long as the calyx, otherwise as in *L. secundiflora*. *Filaments* with a small tuft of hairs in front, otherwise as in *L. secundiflora*. *Fruit* unknown. *Stemonurus capitatus*, Beccari, Malesia, I, 114, tav. XV, figs. 7 to 11; Valetton, Olacineæ, 236.

Malacca: Maingay (Kew Distrib.), No. 385. Penang: Curtis, Nos. 912, 957. Perak: King's Collector, Scortechini.

This species has smaller leaves and different cymes from *L. secundiflora*, but the flowers of the two are very much alike.

15. GONOCARYUM, Miq.

Trees. *Leaves* alternate, simple, penni-nerved, coriaceous. *Flowers* in long axillary spikes, dimorphous. *Calyx* of 5 free, ovate, imbricate sepals. *Corolla* much longer than the calyx, gamopetalous, tubular, with 5 acute spreading short teeth, slightly inflexed at the very apex, and valvate in æstivation. *Stamens* 5, alternate with the teeth of the corolla, the filaments adherent to its tube, free only towards the apex; *anthers* sub-exserted, alternate with the teeth, oblong, bilocular, dehiscent longitudinally. *Ovary* ellipsoid, seated on the glabrous annular disk, minute, bilocular, the cells (unequal?), uniovulate, the ovule pendulous. *Style* 1, very short, the stigma apical. *Drupe* dry, spongy, 4-gonous, ridged, narrowed to each end, crowned by the small incurved style and stigma; the calyx persistent at its base but not enlarged, 2-celled, the obsolete second cell being represented by a cylindrical cavity in the spongy mesocarp; the epicarp membranous, sub-glabrous in its upper half, puberulous towards the apex; endocarp papery, with a few minute

scattered hairs. *Seed* solitary, flattened, the abortive seed very small, both pendulous.

The genus *Gonocaryum* was first published by Miquel in his Fl. Ned. Ind. Suppl. p. 343, to receive the single species *G. gracile*. The generic description is incomplete as regards the structure of the seed, but the specimens with which the author worked have no seeds. I have had an opportunity of carefully examining these specimens and I find that Miquel's description is, as regards the structure of the ovary which is found in the stamiferous flowers, inaccurate. He describes two styles and stigmas, whereas, I can find only one of each. And to this extent, I have modified as above the generic description. I think it highly probable however, that fertile ovaries occur (as in so many members of this family) in distinct flowers, and that these may possibly have two stigmas like *Pteleocarpa* and *Cardiopteris*. Of such flowers however, there is no trace in the scanty materials on which Miquel founded the genus. There are two fruits however on one of the type specimens, and a transverse section of these shows a vertical cavity in the substance of the thick mesocarp on one side which has all the appearance of an aborted loculus. The single perfect seed which has filled the loculus, is too much decomposed for examination. In their *Genera Plantarum*, Messrs. Bentham and Hooker remark (in a note), that they have seen no specimen of *Gonocaryum* Miq. And without admitting it as a genus of *Olacineæ*, they quote Miquel's generic description. The late Mr. S. Kurz, in a note in Journ. As. Soc. Bengal for 1870, Pt. 2, p. 72, propounded the view that *Phlebocalymna* Griff. MSS., as described by Messrs. Bentham and Hooker (*Genera Plantarum* I, 353) is identical with *Gonocaryum*. Kurz, who had examined the specimens on which Miquel founded *Gonocaryum*, also believed Miquel to be wrong about the cells of the ovary; for he states that "the ovary is really one-celled and, to judge from the sterile fruits, 2-ovuled." The abortive seed in the fruit which Kurz examined was, he continues "suspended from the apex just beneath the acumen, and there can be observed also the rudiment of the second superposed ovule." But Kurz entirely overlooked the cylindrical cavity of the abortive loculus. Dr. Scheffer in (Ann. Jard. Bot. Buitenzorg I, 96), published a note on the genera *Gonocaryum* and *Phlebocalymna*, of neither of which had been seen (as he states) good or authentic specimens. In that paper Dr. Scheffer follows Kurz in reducing *Phlebocalymna* to *Gonocaryum*. Scheffer gives also a definition of *Gonocaryum* which differs a good deal from Miquel's. And he describes two new species of this modified *Gonocaryum* (viz., *G. Teysmannianum* and *G. pyriforme*). I have examined the latter, and I do not find it to be a *Gonocaryum* at all, as Miquel defined the genus. Beccari (*Malesia* I,

122) follows Scheffer, adopts his modified definition of *Gonocaryum*, and adds two new species viz., *G. Selebicum*, and (at p. 256), *G. affine*. In my opinion *Gonocaryum* and *Phlebocalymna* are not identical.

The flowers of the two species *P. Griffithiana* and *P. Lobbianum* (which are accepted as constituting the genus *Phlebocalymna*) have the calyx gamosepalous, deeply 5-lobed, the petals only twice as long as the calyx, fleshy, cohering by their edges, but quite separable from each other, their apices fleshy and inflexed; the buds being shortly cylindrical and obtuse, and the fruit elliptic (not 4-gonous), slightly striate, obtuse at each end with a bony (not spongy) and strictly 1-celled endocarp, and there being no trace whatever of an abortive loculus. If the definition of the genus *Phlebocalymna* be amended in these particulars to it certainly belongs *G. pyriforme*, Scheff. And, judging from the description, (for I have not seen specimens) *G. Teysmannianum* Scheff. and *G. Selebicum* Becc., with almost equal certainty belong to *Gonocaryum*. About the allocation of *G. affine*, Becc., the description in *Malesia* I, 256, is too incomplete to enable me to form an opinion.

Racemes 5 to 12 in. in length, flowers

·2 in. long. 1. *G. longe-racemosum*.

Racemes under 3 in. long: flowers ·1 in. long 2. *G. gracile*.

1. GONOCARYUM LONGE-RACEMOSUM, King, n. sp. A small glabrous tree. *Leaves* coriaceous, elliptic-oblong, shortly acuminate, the base slightly narrowed; main nerves about 4 pairs, ascending, prominent on the lower, depressed on the upper surface, length 5 to 7 in., breadth 2·25 to 3·5 in., petiole ·3 to ·5 in. *Racemes* axillary or from the stem and larger branches, puberulous, slender, 5 to 12 in. long. *Flowers* ·2 in. long, irregularly disposed on the rachis, sometimes in pairs; their pedicels ·1 in. long, pubescent. *Sepals* 5, ovate, imbricate, puberulous. *Corolla* tubular, the teeth small and recurved. *Fruit* obovoid-elliptic, with 4 very bold vertical ridges and numerous striæ, 1·5 to 2 in. long, and 1 in. in diam., glabrescent; *mesocarp* very thick, spongy, distinctly 2-celled, the aborted cell narrowly cylindric.

Singapore; Hullett, No. 851; Ridley, No. 4750. Perak; King's Collector, Nos. 7397, 7663; Scortechini.

2. GONOCARYUM GRACILE, Miq. Fl. Ind. Bat. Suppl. 343. A shrub? *Leaves* as in the last, but slightly obovate. *Racemes* under 3 in. in length, and the flowers only about ·1 in. long, fruit 1·5 in. long. Kurz in Journ. As. Soc. Beng. for 1875, II, 155; For. Flora Burma, I, 240. *G. Wallichii*, Mast. Fl. Br. Ind. I, 590; Beccari, *Malesia*, I, 122; Valetton *Olacineæ*, 245: *Platea Griffithiana*, Miers Contrib. I, 97, (not *Phlebocalymna*, Griff). *Gonocaryum*? *Wallichii*, Mast. in Hook. fil. Fl. Br. Ind. I, 590 (note).

Andamans or Tenasserim ; *Helfer* (Kew Distrib.), No. 817.—DISTRIB. Sumatra ; Lebong Moesie, Teysmann.

I include this species here although it is not clear whether Helfer's specimen was collected in the Andamans or in the Tenasserim Province of Burmah. This differs from *G. longe-racemosa* by its shorter more slender racemes, and much smaller flowers. Other differences will no doubt be found when both plants are properly collected. At present the materials of *S. gracile* are very poor indeed. They are, however, sufficient to demonstrate that the plant so long known as *Phlebocalymna Griffithii* does not belong to the same genus as the specimens on which Miquel founded his genus *Gonocaryum*.

16. PHYTOCRENE, Wall.

Climbing shrubs, usually more or less hairy, often prickly ; wood with very large porous vessels and thick medullary rays, but no annual rings. *Leaves* alternate, petiolate, entire or palmately-lobed. *Flowers* dioecious, monochlamydeous ; male in small globose clusters borne on long branching spikes ; female in large solitary globose pedunculate heads. *Male flowers* each with an involucre of 3–5 free pieces ; the perianth single, of 4 pieces, free, or united below and deeply 4-lobed, valvate. *Stamens* as many as the pieces of the perianth and alternate with them, the filaments hypogynous ; *anthers* 2-celled, introrse, dehiscing longitudinally ; *pollen grains* globose, the rudimentary pistil small. *Female flowers* without involucels ; the perianth as in the males, more or less persistent in the fruit ; *staminodes* minute, tooth-like, as many as the pieces of the perianth, or absent. *Pistil* sessile, 1-celled, villous ; *style* thick, tapering ; *stigma* large, sub-capitate or discoid, lobed or emarginate ; *ovules* 2, collateral, suspended from near the apex of the cavity, raphe dorsal, *micropyle* superior. *Drupe*s many, in globose heads, bristly or echinate ; *stone* hard, 1-celled, 1-seeded, pitted externally. *Seed* pendulous ; *embryo* as long as the fleshy albumen ; radicle superior, short ; cotyledons large, flat, appressed.—DISTRIB. Species 8, all natives of India and the Malayan Archipelago.

There is a difference of opinion as to the nature of the organs at the base of the flowers, some authors regarding them as a calyx, while others (e. g. Baillon) regard them as bracteoles. I adopt the latter view, chiefly because these bodies are not isomerous with the inner whorls of the perianth (corolla of some) or with the stamens. A further argument for considering them as bracteoles is found in the allied genus *Miquelia*, in the males of which similar organs are found, and where they are separated from the flower by a long pedicel.

Leaves entire	...	...	...	1. <i>P. oblonga.</i>
Leaves ovate, sometimes 3-lobed			...	2. <i>P. bracteata.</i>
Leaves deeply palmately 5-lobed			...	3. <i>P. palmata.</i>

1. PHYTOCRENE OBLONGA, Wall. Pl. As. Rar. III, 12. Bark brownish, rather rough, striate, not prickly, that of the younger branches puberulous. *Leaves* coriaceous, oblong or oblong-lanceolate, more or less acuminate, entire, the base narrowed; upper surface glabrous, shining, the lower minutely pubescent, minutely lepidote, the reticulations very distinct; main nerves 7 to 9 pairs, curved, ascending, prominent on the lower surface; length 4·5 to 9 in., breadth 2 to 3·5 in., petiole ·6 to 1 in. *Panicles of male flowers* axillary, or clustered on woody warted tubercles on the stem and larger branches, 1 to 2 in. long, and from ·4 to ·5 in. broad, the ultimate branches consisting of minute pedicellate umbellules; the pedicels of the umbellules ·15 in. long, rusty-tomentose, each with a subulate bract shorter than itself. *Flowers* sessile, ·05 in. long, in 4- or 5-flowered umbellules ·15 in. in diam. *Bracts of involucre* free, narrowly deltoid, rufous-sericeous. *Pieces of the perianth* 4, free, ovate, concave, glabrous inside, rufous-sericeous externally. *Stamens* shorter than the perianth, anthers broad. *Rudimentary ovary* minute, sericeous. *Female flowers* in shortly pedunculate globular capitula, ·5 in. in diam., borne on the stem and branches, the peduncle stout, ·25 in. long. *Drupe* cuneate-ovoid, obtuse, 1·5 in. long, and 1 in. in diam.; the base pointed trigonous and strigose; the rest of the surface densely covered with very stout asperulous pale brown bristles, collected in globular heads, the size of a cricket-ball; epicarp leathery, mesocarp pulpy, endocarp crustaceous. *Seed* solitary; cotyledons thin, tortuous, embedded in lobulated fleshy albumen. Baill. in DC. Prod. XVII, 13; Hook. fil. Fl. Br. Ind. I, 592; Wall. Cat., No. 4948. *Gynocephalum oblongum*, Trec. in Ann. Sc. Nat. Ser. 3, VIII, 149.

Penang; Wallich. Malacca; Maingay. Perak; Scortechini, King's Collector.

The female flowers are often diseased, and the petals are converted into a long fleshy tube which contains no trace of ovary.

2. PHYTOCRENE BRACTEATA, Wall. Pl. As. Rar. III, 12. Stems with sharp tubercles; branches striate, minutely prickly when young. *Leaves* coriaceous, broadly ovate, cordate at the base, often 3-lobed and obscurely dentate, the apex acute, upper surface glabrous, the nerves pubescent; lower surface pale, softly and minutely pubescent, reticulations distinct especially on the lower surface; main nerves 4 or 5 pairs, spreading, curved, prominent beneath; length 4 to 8 in., breadth 3 to 5·5 in.; petiole 1·25 to 3 in., minutely tomentose with bristles intermixed. *Panicles of male flowers* bracteate, axillary, 4 to

8 in. long, and from .75 to 1.25 in. broad; the ultimate branches consisting of minute clustered, 6- to 10-flowered, pedicellate umbellules; *bracts* from the bases of the pedicels of the umbellules, .4 or .5 in. long, subulate, curved, hispid. *Flowers* sessile, .05 in. in diam. *Bracteoles of the involucre* 3, deltoid, their apices broad and bifid, glabrous on the inner, densely villose on the outer surface. *Pieces of the perianth* 4, free, ovate-lanceolate, acute, smaller than the sepals, valvate. *Stamens* shorter than the perianth, the anthers broad. *Rudimentary ovary* minute, villous. *Female flowers* (*fide* Griffith) in oblong or spherical pedunculate capitula of which there are several in a leaf-axil. *Style* short, tri-partite; the segments revolute, stigmatiferous on the inner surface. *Ovary* strigose, 1-celled, with 2 pendulous ovules. *Drupe* ovoid, tapering to each end, densely covered with adpressed yellowish bristles, 1.5 in. long, and .75 in. in diam., 1-celled, crowded in dense pendulous globose capitula as large as a man's head. *Seed* solitary, albumen fleshy, radicle broad; cotyledons small, orbicular. Baill. in DC. Prod. XVII, 12; Hook. fil. Fl. Br. Ind. I, 592; Kurz For. Flora Burmah I, 242; Beccari Malesia, I, 127: Wall. Cat. No. 4947. *P. macrocarpa*, Griff. Notul. IV, 322: Ic. Pl. Ind. Or. 487 and 488. *Gynocephalum bracteatum*, Trec. in Ann. Sc. Nat. Ser. 3, VIII, 149, No. 3.

Penang; Porter, Curtis. Malacca; Griffith. Perak; King's Collectors. Singapore; Maingay, Ridley.—DISTRIB. Borneo.

3. PHYTOCRENE PALMATA, Wall. Pl. As. Rar. III, 12. Stem minutely prickly; the younger branches rufous-hispid, striate. *Leaves* coriaceous, reniform, deeply 5-lobed; the lobes oblong, acuminate or acute; upper surface glabrous, the lower densely covered with soft coarse rufous or yellowish hairs; main nerves 5 to 7, palmate, prominent on the upper, depressed on the lower surface; length 7 to 12 in., breadth about the same; petioles 3 to 5 in., densely ferruginous-pilose. *Panicles of male flowers* axillary, 2.5 to 13 in. long, and about 1.5 in. broad, the ultimate branches consisting of minute 12- to 15-flowered, pedicelled, ebracteate umbellules; pedicels .15 in. long, softly pubescent. *Male flowers* as in *P. oblonga*. *Female flowers* in shortly pedunculate axillary ovoid capitula, .5 in. in diam.; the peduncle .25 in. long, pilose. *Flowers* .2 in. long, sessile. *Bracteoles of the involucre* of two deltoid bifid pieces: *corolla* 0. *Ovary* ovoid, pointed, densely hirsute. *Drupe* numerous, ellipsoid, slightly obovoid, tapering much to the base, the apex acute, the whole surface more or less densely covered with yellowish shining stiff hairs; 1.5 to 2 in. long, and .75 in. in diam., collected in sub-globular heads 3 or 4 in. in diam., Baill. in DC. Prod. XVII, 11; Miq. Ann. Mus. Lugd. Bat. III, 248; Hook. fil. Fl. Br. Ind. I, 592; Beccari Malesia, I, 127. *Gynocephalum palmatum*, Trec. in Ann. Sc. Nat. Ser. 3, VIII, 149: Wall. Cat., 4949.

Penang ; Wallich, Curtis. Malacca ; Griffith. Perak ; King's Collector, Wray.

17. MIQUELIA, Meissner.

Climbing shrubs, the wood with large vessels. *Leaves* alternate, simple, entire or dentate, petiolate, penni-nerved. *Flowers* dioecious, the males pedicellate and in clustered umbels, the females sessile and in solitary capitula. *Male flowers* each on a long pedicel with a whorl of minute bracteoles at its base. *Perianth* 5-merous, the pieces oblong or lanceolate, free or united at the base, valvate. *Stamens* equal to the pieces of the perianth and alternate with them ; filaments short, anthers linear-oblong, 2-celled, introrse, disk 0. *Rudimentary pistil* small. *Female flowers* ;—bracteoles as in the male, sometimes united by their bases. *Flowers* sessile, the perianth deeply divided into 4 fleshy lanceolate reflexed segments. *Disk* none. *Ovary* solitary, compressed, crowned by the large discoid stigma, 1-celled, with 2 pendulous collateral ovules, raphe dorsal, radicle superior. *Drupe* oblong, more or less compressed, the calyx persistent at its base, the mesocarp thin ; the endocarp crustaceous, rugose externally, often verrucose internally. *Seed* suspended, solitary, with thin testa, albumen fleshy rugulose, radicle superior ; cotyledons elliptic, thick, leafy. Species about 5 Indian and Malayan.

1. MIQUELIA CAUDATA, King, n. sp. A slender climber 10 to 20 feet long ; branches thin, pale, striate. *Leaves* membranous, oblong-lanceolate, shortly acuminate, the base narrowed ; upper surface glabrous, the lower puberulous especially on the midrib and 5 or 6 pairs of spreading, curving, ascending or spreading main nerves ; length 5 to 8 in., breadth 1·5 to 2 in., petiole ·5 to ·65 in. *Umbels of male flowers* ·65 to 1 in. long, in fascicles from pilose tubercles on the stem, axillary or extra-axillary. *Bracteoles of involucrel of each flower* 4 or 5, free or united at the base, lanceolate, pilose. *Pedicels of flower* ·15 to ·2 in. long, pubescent. *Flowers* ·15 in. in diam., the segments of the perianth spreading, puberulous ; *filaments* shorter than the linear-oblong sagittate anthers. *Rudimentary ovary* minute, hirsute. *Capitules of female flowers* ·25 in. long, ovoid, solitary, axillary ; their peduncles 2 to 2·5 in. long, puberulous. *Flowers* sessile, ·15 in. in diam. ; perianth leathery, glabrous. *Ovary* tomentose ; the stigma discoid, depressed in the centre, wider than the ovary, glabrous. *Drupe* broadly ovoid, slightly compressed, rounded and broad at the base, tapering upwards into a long terminal tail crowned by the persistent stigma ; epicarp thin, rusty-pubescent on the surface ; endocarp bony, rough, and pitted on the outer surface, smooth and tubercled on the inner ; length from base to apex 1 to 1·25 in., breadth at base ·6 in.

Perak; Scortechini, King's Collector.

This species is closely allied to *M. Kleinii*, which is a common plant in the forests at the base of the Assam Hill Ranges. This differs from *M. Kleinii* chiefly in its fruit having a long apical tail which is quite absent in the former. The male flowers also differ in the two species. The genus *Miquelia* was founded by Meissner (*Plant. Vasc. Genera*); but Griffith, over-looking Meissner's description, published *M. Kleinii* under the name *Jenkinsia Assamica*, in 1844, in the *Calcutta Journal of Natural History*, Vol. 4. 231, t. 12. A description and figure of the female flowers are to be found in the same author's *Notulæ*, 370; and a figure in his *Icones*, t. 537, fig. 2. Wallich issued the Assam plant as No. 6760 of his *Catalogue* under the name *Zanonia? oblonga*.

18. SARCOSTIGMA, W. and Arn.

Climbing shrubs. *Wood* without zones. *Leaves* alternate, simple, shortly petioled, much reticulate. *Flowers* dioecious, minute, arranged in glomeruli along a long pendulous rachis. MALE fl.: *Calyx* minute, cupular, 4-5 lobed. *Petals* 5, free, or nearly so, valvate, oblong, ultimately reflexed. *Stamens* 5, alternate with the petals, free, or adnate to the base of the petals, filaments glabrous; *anthers* ovate, sagittate, erect, 2-celled, dehiscing longitudinally. *Pistil* rudimentary. FEMALE fl.: *Calyx* and *corolla* as in the male, but shorter and more fleshy. *Staminodes* 4-5, hypogynous, alternate with the petals. *Ovary* superior, sessile, 1-celled; *stigma* sub-sessile, discoid or umbonate; *ovules* 2, collateral, pendulous, funicle thick. *Drupe* oblong, more or less compressed, surrounded at the base by the persistent calyx and corolla; *epicarp* coriaceous; *endocarp* woody, lined with a thin white membrane. *Seed* (according to Baillon) pendulous, exalbuminous; *cotyledons* fleshy, wrapping round the short superior radicle.--DISTRIB. Species 3 or 4, all tropical Asiatic.

SARCOSTIGMA WALLICHII, H. Brongn. in *Adansonia*, X, 282. A powerful climber; young branches pale, puberulous at first, afterwards glabrous like all the other parts except the inflorescence and fruit. *Leaves* coriaceous, shining, much reticulate, oblong to broadly ovate, acute, the base narrowed, under surface sometimes sparsely pubescent; main nerves 5 to 7 pairs, much curved, ascending; length 4 to 7 in., breadth 1.5 to 4.5 in., petiole .4 to .6 in. *Spikes of male flowers* axillary or extra-axillary, solitary or in fascicles, often nearly as long as the leaves, softly rufous-tomentose; *flowers* .1 to .15 in. long, sessile. *Calyx* a membranous, obscurely-toothed cup, rufous pubescent outside, glabrous inside. *Petals* about four times as long as the calyx, lanceolate, spreading, slightly united at the base, the apices inflexed, pubescent outside, gla-

brous inside. *Stamens* shorter than the petals, filaments glabrous. *Rudimentary ovary* ovoid, obtuse, pubescent. *Disk* none. *Female flowers* not seen. *Drupe* ovoid or globular-ovoid, compressed, 1.25 in. long and .75 in. in diam.; *pericarp* leathery, densely rusty-tomentose; *mesocarp* pulpy, rather copious; *endocarp* thinly bony, smooth on both surfaces. Baillon in DC. Prod. XVII, 16; Hook. fil. Fl. Br. Ind. I, 594; *S. edule*, Kurz, For. Flora Burmah I, 242. *Chaillietia edulis*, Wall. Cat. 9030 ("indetermin.") Kurz in Andaman Report, App. 6.

S. Andaman; Kurz, King's Collector.—DISTRIB. Burmah.

Kurz himself (in Herb. Calcut.) reduced his species *S. edule* to *S. Wallichii* Baill., and there is no doubt the reduction is right.

19. IODES, Blume.

Climbing shrubs, rarely erect. *Leaves* opposite, or sub-alternate, petiolate, simple, penni-nerved. *Inflorescence* cymose, cymes axillary or extra-axillary; lower peduncles often sterile, cirrose. *Flowers* dichlamydeous, dioecious. MALE fl.: *Calyx* minute, cup-shaped, 5-toothed. *Corolla* 5-merous, lobes valvate. *Stamens* hypogynous, equal in number to, and alternate with the lobes of the corolla; *anthers* basifixed, straight, 2-celled, introrse, dehiscing longitudinally. *Pistil* rudimentary. FEMALE fl.: *Calyx* as in the male. *Corolla* 5-parted, the segments united below. *Staminodes* 0. *Ovary* sub-sessile, 1-celled, with 2 collateral pendulous ovules; *stigma* sessile, discoid. *Drupe* surrounded at the base by the persistent, but not accrescent calyx; *stone* 1-seeded. *Seed* pendulous, testa thin, albumen fleshy; *cotyledons* flat, leafy; *radicle* superior.—DISTRIB. Species about 8, natives of India, the Malayan Archipelago and tropical Africa.

Flowers 4-merous 1. *I. reticulata*.

Flowers 5-merous.

Calyx cupular with 5 minute teeth ... 2. *I. velutina*.

Calyx deeply divided into 5 lanceolate lobes.

Leaves ovate to rotund, pubescence rufous 3. *I. ovalis*.

Leaves oblong or oblong-lanceolate; pubescence cinereous 4. *I. oblonga*.

1. IODES RETICULATA, King, n. sp. A woody creeper 20 or 30 feet long; young branches slender, striate, with a broad line of tomentum on one side, changing sides at the nodes. *Leaves* thinly coriaceous, elliptic or broadly ovate, sometimes slightly obovate, shortly acuminate, narrowed slightly to the rounded or sub-emarginate base; both surfaces minutely but boldly reticulate, the upper glabrous, the lower with long soft hairs especially on the midrib and nerves; main nerves 4 or 5 pairs,

curving, ascending, prominent beneath as are the transverse nervules; length 2 to 5 in., breadth 1·3 to 2·5 in., petiole ·4 to ·6 in. *Cymes* both of male and female flowers terminal and extra-axillary, or occasionally axillary, usually much longer than the leaves, much-branched, and sometimes bearing tendrils, softly olivaceous-pubescent; pedicels longer than the flowers. *Male flowers* less than ·05 in. long, 4-merous, globular in bud. *Calyx* shorter than the corolla, with 4 acute segments, densely pilose outside. *Corolla* with 4 broadly ovate concave lobes, pilose outside and glabrous inside. *Stamens* shorter than the corolla, *anthers* broadly ovate, *rudimentary ovary* minute. *Female flowers* like the males but larger and with the lobes of the corolla reflexed. *Ovary* cylindric, tomentose, crowned by the broad discoid stigma, 1-celled, with 2 pendulous collateral ovules. *Drupe* elliptic, compressed, the apex with a slight apiculus bearing the stigma, the base narrowed; the calyx and corolla persistent but not enlarged, minutely velvety; *endocarp* bony, 4-angled, smooth inside. *Seed* solitary.

Perak; Wray, King's Collector.

The tetramerous very small flowers, and large velvety fruit, distinguish this species. The young branches are sub-glabrous on one side and densely pubescent on the other; at the nodes these two lines cross.

2. *IODES VELUTINA*, King, n. sp. A scandent shrub; young branches slender, terete, shortly rufous-pubescent, especially so on one side. *Leaves* coriaceous, ovate, acute or very shortly acuminate; the base rounded, slightly emarginate; upper surface sparsely and minutely pilose, the midrib tomentose; lower surface densely velvety-tomentose; main nerves about 4 pairs, ascending, curved; length 2·5 to 3·75 in., breadth 1·35 to 2·25 in., petiole ·35 to ·6 in. *Cymes* axillary, terminal or leaf-opposed, longer than the leaves, pubescent, few-flowered, sometimes bearing tendrils. *Male flowers* ·1 in. long, or slightly more, globose-ovoid in bud, on very short pedicels. *Calyx* cupular, with 5 small acute teeth. *Corolla* little more than twice as long as the calyx, with 5 deep oblong concave teeth with inflexed apices, adpressed-pilose externally and glabrous internally like the calyx. *Stamens* nearly as long as the corolla; the filaments short, pilose, the anthers oblong. *Rudimentary ovary* ellipsoid, pilose. *Drupe*s elongated-obovoid, compressed, 4-angled, obtuse or retuse at the apex, the stigma persistent, much narrowed to the base where the corolla and calyx are persistent, minutely cinereous-tomentose, 1·25 in. long, and ·5 in. broad; *endocarp* bony, more or less 8-angled, smooth inside. *Seed* solitary, compressed.

Malacca; Maingay (Kew Distrib.), No. 380, and perhaps No. 1039. Perak; Scortechini, Wray.

The leaves of this resemble those of *I. ovalis*, Bl.; but they are more velvety beneath. The calyx and fruit are much larger than in that species and the cymes have fewer flowers.

3. *IODES OVALIS*, Blume Bijdr. 30. A climbing shrub 20 to 60 feet long; young branches slender, rufous-tomentose, striate, with a few axillary or leaf-opposed tendrils. *Leaves* opposite, sub-coriaceous, ovate to rotund, acute or very shortly acuminate, the base rounded sometimes slightly emarginate; upper surface glaberrulous, the midrib and nerves rufous-tomentose like the whole of the lower surface; main nerves 4 or 5 pairs, curved, ascending, prominent on the lower surface as are the transverse veins; length 2·5 to 5·5 in., breadth 1·75 to 3·25 in. *Male flowers* in leaf-opposed or terminal, much-branched, lax, rufous-tomentose cymes 6 to 8 in. long. *Flowers* ·15 in. in diam., on pubescent pedicels ·1 to ·2 in. long. *Calyx* discoid, irregularly 3- to 6-toothed rufous-villose. *Corolla* 5 or 6 times as long as the calyx, deeply divided into 5 lanceolate lobes with long acuminate inflexed points, strigose externally, glabrous internally; *stamens* much shorter than the corolla-lobes, the filaments much shorter than the broadly ovate anthers; *rudimentary pistil* erect, cylindric, pilose. *Female flowers* with calyx and corolla like the male; *stamens* 0. *Ovary* cylindric, tomentose, crowned by a large discoid stigma wider than itself, 1-celled, with 2 pendulous ovules. *Drupe* ovoid, compressed, slightly oblique at the base, rufous-tomentose, crowned by the persistent stigma, ·75 in. long, and ·5 in. in diam., *pericarp* thin; *endocarp* bony, rugose outside, smooth inside. Mast. in Hook. fil. Fl. Br. Ind. I, 596; Beccari Malesia, I, 124; Baill. in DC. Prod. XVII, 22; *I. tomentella* cum var. Br. in Benn. Pl. Jav. Rar. 243, t. 48; Hassk. Cat. Pl. Hort. Bogor. 172; Miq. Fl. Ind. Bat. i. 795. *I. tomentella*, Miq. Fl. Ind. Bat. I, Pt. 1, 796; Kurz For. Flora Burmah I, 243. *Natsatium oppositifolium*, Planch. in Hook. Lond. Journ. Bot. V, 247.

Malacca; Griffith, Maingay. Perak; Scortechini, Curtis, King's Collector; common.—DISTRIB.—Burmah, Sumatra.

4. *IODES OBLONGA*, Planch. in Hook. fil. Fl. Br. Ind. I, 597. A slender climbing shrub; young branches cinereous-tomentose, ultimately glabrescent and rugose. *Leaves* membranous, oblong or oblong-lanceolate, glabrous above except the pilose midrib and nerves, beneath adpressed-pilose, the midrib pubescent; main nerves 7 or 8 pairs, curving, spreading; length 3 to 4·5 in., breadth 1 to 1·6 in., petiole ·3 or ·4 in. *Cymes of male flowers* axillary or terminal, dichotomously branched, slender, cinereous-pilose. *Male flowers* ·05 in. long. *Calyx* nearly as long as the corolla, with 5 deep lanceolate lobes. *Corolla* rufous-tomentose externally. *Female flowers* and drupes not seen,

Penang; Phillips, Curtis, No. 2438. Singapore; King's Collector, No. 1185.

This species has smaller flowers, with a longer calyx, than the last: its leaves are narrower, and its pubescence is cinereous not rufescent.

20. ERYTHROPALUM, Blume.

Climbing glabrous shrubs with axillary tendrils. *Leaves* alternate, entire, 3- to 5-nerved at the base. *Cymes* slender, pedunculate, dichotomous; the cymules umbellate, minutely bracteolate. *Flowers* bisexual. *Calyx* with 5 broad short teeth, imbricate in æstivation, its tube adherent and much enlarged in fruit. *Corolla* perigynous; *petals* 5, short, broad, spreading, slightly coherent by their bases, inserted outside the large cupular fleshy 5-lobed disc, valvate in æstivation. *Stamens* as many as the petals, opposite to them and slightly attached to their bases, *filaments* short; *anthers* broadly ovate with lateral longitudinal dehiscence, the connective rather large. *Ovary* half immersed in the disc, tapering to a short terminal style, 1-celled; *ovules* 1 to 3, pendulous from the apex; *stigma* minute, 3-lobed. *Fruit* crowned by the persistent calyx-lobes and the disc, oblong, 1-celled; the pericarp and putamen thin, lined by a pulpy coat, splitting, when dry, into 3 to 5 vertical segments. *Seed* solitary, pendulous; the embryo minute, lying near the apex of the large fleshy albumen.

To this genus there are attributed in the Flora of British India three species, viz., *E. scandens*, Bl. *E. populifolium*, and *E. vagum*, Mast. Each of the three originally appeared in Botanical literature as the type of a distinct genus. Of these three genera, *Erythropalum* is the oldest and is therefore now retained. It was founded by Blume (Bijdr. 921) in 1826, and was by him referred to the Natural order *Cucurbitaceæ*. As Blume describes the flowers as monœcious, his material was presumably imperfect. For the reception of the second species, Dr. Walker-Arnott, in Jardine's Magazine of Zool. and Bot. for 1838, p. 551, formed the genus *Mackaya*, and in an excellent note he discusses its affinities. Of it he says, "I cannot indicate the natural order, nor even the place in the linear series which it ought to occupy;" but on the whole he was inclined to regard it as a species of *Olacineæ* near *Schœpfia*, but with perfectly inferior fruit. Walker-Arnott considered it to be also allied to *Santalaceæ*, although differing both from that Order and from *Olacineæ* in the absence of a central columella in its ovary; while, from *Santalaceæ*, it has the additional difference of possessing a corolla. And he suggests the formation of *Mackaya* and *Schœpfia* into a small calycifloral order connected on the one hand with *Santalaceæ* and on the other with *Olacineæ*. The third species *E. vagum* Mast., was first published by Griffith (Notulæ IV, 633 and Ic. Pl. Ind. Or. t. 628) as the type of a genus which, from its supposed affinity with *Modecca*, be named *Modeccopsis*. The relation to *Modecca* is however superficial, and extends only to a similarity in general habit and in the externals of the fruit. For in structure the flowers of *Modecca* are very different from those of *Modeccopsis*, inasmuch as they have no perigynous (finally epigynous) disc, and the superior ovary

has 3 parietal multi-ovulate placentas, while the fruit is a 3-valved many-seeded capsule. Planchon [Ann. des Sc. Nat. Ser. IV. Bot., Vol. II, p. 260 (1854,)] suggests the formation of a natural order for the reception of the single species *Erythropalum*, a suggestion followed by Miquel; while Baillon puts it (along with *Olacineæ*, *Santalaceæ*, *Ampelideæ*, *Styraceæ*, and *Loranthææ* proper) into his order *Loranthacées*. Messrs. Hooker and Bentham put *Erythropalum* into *Olacineæ*, where, in spite of its affinities with the Cornaceous genus *Nyssa*, it may be left for the present, although its inferior fruit makes its inclusion in *Olacineæ* rather an anomaly. To this genus also without doubt belong *Decastrophia*, Griffith (Notulæ IV, 737); *Erythropalla*, Hassk. Cat. Hort. Bogor, 191; and in all probability (as Valenton suggests) the obscure plant named *Balingayum decumbens* by Blanco (Fl. de Filip. 187.)

1. *ERYTHROPALUM SCANDENS*, Blume Bijdr. 921. *Leaves* membranous, ovate-oblong or elliptic to oblong-lanceolate, acuminate, the base rounded or minutely cordate, sub-peltate; basal nerves 3 to 5, two of them minute; lateral nerves about 4 pairs, distant, faint: length 3 to 6 in., breadth 1·75 to 3·75 in., petiole ·75 to 1·75 in. *Tendrils* (abortive peduncles) simple or bifid, thickened upwards. *Cymes* slender, shorter than the leaves, divaricate, the peduncles long. *Flowers* under ·1 in. in diam. *Fruit* oblong, ellipsoid or slightly obovoid, glabrous, the epicarp yellowish. *Seed* large, ovoid, without testa. Miq. Fl. Ind. Bat. I, Pt, 1, 704; Hook. fil. Fl. Br. Ind. I, 578; Pierre For. Flor. Coch. Chine, t. 269 A; Kurz For. Flora Burma, I, 234; Valeton *Olacineæ* 132; Wall. Cat. 7539 *Menisperma*?; also No. 9033 (without name). *Cocculus calophyllus*, Wall. MSS.

Malacca, Perak:—DISTRIB. Java, Burmah, Tropical Himalaya, Khasia Hills.

Closely allied to, if not identical with, this is *E. vagum*, Mast. And *E. populifolium* Mast. (Wall. Cat. Nos. 1233 BIS. and 2248; *Passiflora Heyneana*, Wall.)

21. PTELEOCARPA, Oliv.

Trees. *Leaves* alternate, simple, penni-nerved, petiolate. *Inflor-escence* terminal, paniced, many-flowered. *Flowers* regular, dichlamy-deous, hermaphrodite. *Calyx* tubular below, limb deeply 5-parted, lobes imbricate, not accrescent. *Corolla* tubular below-limb deeply 5-parted, lobes imbricate, glabrous. *Stamens* 5, glabrous, attached to the tube of the corolla, alternate with its lobes; *anthers* linear-oblong, innate, dehiscing longitudinally. *Ovary* free, stipitate, 2-celled; *styles* 2, *stigmas* small; *ovules* solitary in each cell, pendulous, anatropal, raphe lateral or subventral. *Fruit* 2-celled, samaroid, orbicular, emarginate; the wings broad, thin, striate. *Seed* elongate, much compressed, albuminous; *radicle* superior, cylindrical; cotyledons linear-lanceolate, longer than the radicle.—DISTRIB. Species 2, both Malayan.

PTELEOCARPA MALACCENSIS, Oliver in Trans. Linn. Soc. XXVIII, 515, t. 42. A tree; young branches terete, glabrous, slender; all parts except the puberulous inflorescence glabrous. *Leaves* membranous, oblanceolate or oblanceolate-oblong, shortly and bluntly acuminate, the base much narrowed; midrib prominent beneath, the 5 or 6 pairs of curving spreading main nerves obscure on both surfaces; length 3 to 4·5 in., breadth 1·25 to 1·5 in., petiole ·6 to ·75 in. *Panicles* terminal, umbellately cymose, spreading, many-flowered, 1·5 to 2·5 in. in diam.; bracts minute, deciduous. *Pedicels* ·15 to ·25 in. long, filiform, ascending, lengthening in fruit. *Flowers* yellow, (or red?) ·3 in., in diam. *Calyx-lobes* broadly ovate, obtuse, puberulous. *Corolla* four times as long as the calyx, its tube short, the lobes deep, oblong, obtuse. *Stamens* as long as the corolla; the filaments slender, glabrous, the anthers elliptic. *Ovary* on a short thick stalk, oblong, glabrous, compressed, slightly furrowed, obtuse. *Fruit* 1·25 to 1·65 in. long, the calyx persistent at the base not quite so broad. *Seed* ·5 in. long: embryo much shorter than the albumen. Beccari, Malesia, I, 130; Miq. Fl. Ind. Bat. Suppl. 511.

Malacca; Maingay. Penang; Curtis, Nos. 835 and 1494. Perak; Wray, No. 3418. Singapore; Hullett, Nos. 3609 and 3610.

I have seen an authentic specimen of *Dodonæa Lamponga*, Miq. (Fl. Ind. Bat. Suppl. 511) and there can be no doubt that it belongs to this or to a closely allied species. It was collected by Teysmann in Eastern Sumatra. Beccari has described (Malesia, I, 130) a species (*P. longistyla*) from Borneo, which appears to differ from *P. malaccensis* by the length of its styles and the shortness of the filaments of its stamens.

22. CARDIOPTERIS, Wall.

Herbaceous, scandent, glabrous, the juice milky. *Leaves* alternate, long-petiolate, simple, palminerved. *Flowers* small, hermaphrodite regular, in axillary long sparse few-branched panicles. *Calyx* 5-partite, the lobes imbricate, persistent in the fruit, but very slightly accrescent. *Corolla* very deciduous, sub-campanulate, deeply 5-lobed, imbricate. *Stamens* attached to the short tube of the corolla and alternate with its lobes; filaments short, glabrous; anthers 2-celled, introrse, with vertical dehiscence. *Disk* none. *Pistil* free, cylindrical, slightly compressed, 1-celled: crowned by two stigmas, the one stipitate short and capitate, the other elongating after flowering. *Ovules* 2 (1 usually aborted), pendulous from the apex of the ovary. *Fruit* samaroid, obovate, oblong, emarginate at the apex; the nucleus narrow, elongate, prolonged laterally into membranous, horizontally striate wings and crowned by the columnar accrescent stigma. *Seed* solitary, pendulous, linear, sulcate, with thin testa,

fleshy granular albumen, and small conical embryo.—DISTRIB. A single Malayan species.

CARDIOPTERIS LOBATA, Wall. Cat. 8033 A, and in Benn. Pl. Jav. Rar. 246, t. 49. *Stems* twining, terete, striate, pale when dry. *Leaves* membranous, ovate-cordate, acuminate, more or less lobed, glabrous; main nerves 7 to 9, radiating from the apex of the petiole; length 2·25 to 5 in., breadth 1·5 to 2·75 in., petiole 2 to 5 in. long. *Panicles* 2 to 4 in. long, solitary, axillary, on long peduncles with a few long slender recurved few-flowered branches. *Flowers* distant, .1 in. long, on short puberulous pedicels. *Calyx* puberulous; corolla slightly longer than the calyx, pale. *Anthers* emarginate. *Fruit* .8 to 1·25 in. long, by .6 to .8 in. broad, the calyx persistent and very slightly accrescent. *Seed* sub-cylindric, compressed: Miq. Fl. Ind. Bat. I, Pt. 1, 799. H. Brongn. in Adansonia, X, 280: Baillon in DC. Prod. XVII, 26. *C. moluccana*, Blume, Rumphia, IV, 207. t. 177, f. 2. *C. javanica*, Blume l. c. III, 206, IV, t. 177. *Peripterygium quinquelobum*, Hassk. Cat. Pl. Hort. Bogor. 351. *Olus sanguinis*, Rumph. Herb. Amb. V, t. 482.

Perak: King's Collector.—DISTRIB. British India, Siam, Malayan Archipelago, New Guinea.

A widely distributed plant, varying considerably as to the form of its leaves. On these diversities of shape, four varieties have been founded.

The position of *Cardiopteris* has given rise to considerable discussion. Robert Brown was the first to suggest its affinity to *Phytocrene* and *Iodes*. By Wallich (its original founder) the genus was placed in *Sapindaceæ*; Hasskarl placed it in *Euphorbiaceæ*; and Blume regarded it as forming a separate family near *Boraginææ* and *Verbenaceæ*. There is no doubt that the gamopetalous character of the corolla and the absence of a disk are characters at variance with those of the majority of the species which are grouped in the family of *Olacineæ*; but the ovulation and structure of the fruit of *Cardiopteris* are quite unlike those of either of the gamopetalous families suggested as allies by Blume. The single character which, in my opinion, suggests a relationship with *Euphorbiaceæ* is the milky nature of the juice. The stamens and ovary, as Brown pointed out, are essentially those of *Iodes*, from which genus however this differs in calyx and in fruit. The genus with which, as it appears to me, there is by far the closest relationship is *Pteleocarpa*, Oliver. In fact the only characters which separate *Pteleocarpa* from *Cardiopteris* are that *Pteleocarpa* is a tree, while *Cardiopteris* is a scandent milky-juiced herb; and that *Pteleocarpa* has a 2-celled ovary and 2-celled fruit. And even this latter distinction is to a great extent neutralised by

the facts that, although there are two cells in the ovary of *Pteleocarpa*, there is only 1 ovule in each; and that both genera have two stigmas which are to some extent persistent in the fruit. The fruits of the two are strikingly alike, both being samaroid; and in this respect differing from all the other Asiatic genera which it has ever been proposed to include in *Olacineæ*. So great are the affinities of the two genera with each other, and so great their divergence from the other genera in the order, that I think they ought either to be separated as a tribe of *Olacineæ* or that the Natural family *Cardiopterideæ* first suggested by Blume, partially approved of by R. Brown, and adopted by Baillon, should be kept up, and that *Pteleocarpa* should be added to it.

ORDER XXX.—ILICINEÆ.

Shrubs or trees. *Leaves* alternate, simple, exstipulate, or with 2 minute stipules, usually coriaceous and evergreen. *Flowers* small, in axillary cymes fascicles or umbellules, usually dioecious; ♂ with imperfect ovary, and ♀ with imperfect stamens. *Calyx* 3–6-partite or -lobed; segments or lobes imbricate, persistent. *Petals* 4–5, rarely 6–8, connate at the base, or connate in the ♂ and free in the ♀, deciduous, imbricate. *Stamens* 4–5, adhering to the bases of the petals, sometimes free and hypogynous in the ♀: *filaments* subulate; *anthers* shortly oblong, dorsifixed. *Disk* 0. *Ovary* free, 3–16-celled; *style* 0, or very short, rarely long, stigma capitate or discoid; *ovules* 1, or 2 collateral, pendulous, raphe dorsal, micropyle superior, funicle often cupular. *Drupe* with 2 or more 1-seeded, free, rarely connate stones. *Seed* with a membranous testa, fleshy albumen and minute embryo.—DISTRIB. Three genera, and about 220 species, chiefly tropical.

1. ILEX, Linn.

Calyx 4–5-lobed or -parted. *Corolla* with petals free or connate at the base and rotate. *Stamens* 4–5, adhering to the base of the corolla in the ♂, sometimes hypogynous in the ♀. *Ovary* 2–12-celled; *styles* 0 or very short, stigmas free or confluent on the top of the ovary. *Drupe* globose, very rarely ovoid, with 2–16 stones.—DISTRIB. Of the Order; species about 220.

Flowers of both sexes in simple axillary

racemes ... 1. *I. spicata*.

Flowers in axillary fascicles.

Pyrenes 6 or 7

Leaves very obtuse, entire ... 2. *I. epiphytica*.

Pyrenes 4

Leaves acute, serrulate ... 3. *I. Griffithii*.

- Leaves shortly acuminate, entire ... 4. *I. glomerata*.
 Flowers of both sexes in branched pedunculate
 cymes.
 Pyrenes 4 to 6 ; nerves of leaves 10 to 12
 pairs ... 5. *I. Maingayi*.
 Pyrenes 8
 Cymes dense, capituliform ; nerves of
 leaves 7 or 8 pairs ... 6. *I. macrophylla*.
 Cymes branched, often paniculate, rather
 lax ; nerves of leaves 6 to 8 pairs ... 7. *I. cymosa*.
Imperfectly known ... 8. *I. sclerophylla*.

1. *ILEX SPICATA*, Bl. Bijdr. 1149. A glabrous shrub (sometimes epiphytal, *fide* Blume) ; young branches rather stout, pale, glabrous. *Leaves* coriaceous, elliptic, shortly and abruptly caudate-acuminate, the base rounded or slightly cuneate ; the midrib stout, prominent beneath, depressed above ; main nerves 7 to 12 pairs, faint, spreading (not much more prominent than the secondary) straight, interarching within the edge ; length 3·5 to 6 in., breadth 1·5 to 2 in., petiole ·2 in. *Racemes* solitary or in pairs, axillary, ·75 to 1·5 in. long, sub-erect or spreading, puberulous, the bracts minute, pedicels 1 in. long. *Flowers* shorter than the pedicels. *Calyx* rather flat, with 4 or 5 broad rounded lobes. *Petals* broadly oblong, united at the base, finally reflexed. *Stamens* as many as the petals, inserted at their edges near the base ; *filaments* longer than the corolla, *anthers* small. *Female flowers* like the male, but the petals and stamens smaller. *Ovary* broadly ovoid, compressed, 16-celled ; the stigma large, sessile, elongate. *Drupe* ·15 in. long, broadly ovoid, compressed, the stigma persistent ; *pyrenes* 10 to 16, compressed. Hook. fil. Fl. Br. Ind. I, 598. *Prinos spicata*, Miq. Fl. Ind. Bat., I, Pt. 2, 594.

Malacca : Maingay (Kew Distrib.), No. 390. Perak : King's Collector, No. 2463.—DISTRIB. Java, (?) Borneo, Sumatra.

A species readily distinguished by its compressed fruit which has moreover many pyrenes (from 10 to 16).

2. *Ilex epiphytica*, King, n. sp. A small glabrous epiphytic shrub ; young branches rather stout, pale brown, striate. *Leaves* coriaceous, oval or elliptic, sometimes sub-obovate, very obtuse, the edges entire recurved when dry, the base slightly narrowed ; main nerves 5 or 6 pairs, rather straight, spreading, not prominent ; length 2 to 2·75 in., breadth 1 to 1·35 in., petiole ·15 in., stout. *Female flowers* in axillary fascicles of 5 to 7, ·15 in. in diam., their pedicels ·15 in. long. *Calyx* with 5 to 7 broadly ovate concave obtuse imbricate teeth, puberulous at the edges. *Petals* 6, oblong, sub-obtuse, longer than the calyx, free, nearly equal, imbricate. *Ovary* broadly ovoid, tapering to the very short style,

6- or 7-celled; *stigma* discoid, dotted in the middle. *Drupe* ovoid, .2 to .25 in. long, crowned by the persistent style and stigma; *pyrenes* 6 or 7, trigonous. *Male flowers* not known.

Perak; at elevations of about 5,000 feet, Wray, No. 3811; King's Collector, No 7413.

3. *ILEX GRIFFITHII*, Hook. fil. Fl. Br. Ind. I, 601. A bush or small tree; young branches stout, pubescent or glabrescent. *Leaves* coriaceous, elliptic, rarely elliptic-rotund, acute, the edges serrulate, the base slightly narrowed; upper surface glabrous, except the depressed puberulous midrib; lower surface puberulous or glabrescent, the midrib prominent and pubescent; main nerves about 8 pairs, spreading, inter-arching far from the edge; length 1 to 2.5 in., breadth .5 to 1.3 in., petiole .15 to .25 in. *Flowers* 4-merous; the males fascicled, less than .2 in. in diam., on pedicels longer than themselves. *Female flowers* larger than the males, in smaller fascicles, and sometimes solitary. *Calyx* a shallow cup, with 4 broad shallow ciliolate lobes. *Petals* broadly oblong, obtuse, finally re-curved, connate near the base. *Ovary* globose; *stigma* sessile, 4-lobed. *Drupe* globose or ovoid-globose, glabrous or glabrescent, .15 in. in diam., the pulp scanty; *pyrenes* 4, coriaceous, rounded at the back; *pedicel* .35 to .6 in. long.

Malacca: Griffith, Maingay. Perak: Wray, King's Collector.—
DISTRIB.: Sumatra, Java, Khasia Hills and Cachar, Assam.

4. *ILEX GLOMERATA*, King, n. sp. A glabrous shrub or small tree; young branches, slender, dark-coloured. *Leaves* thinly coriaceous, oblong or elliptic-oblong, acuminate, the edges entire slightly wavy and recurved when dry, the base cuneate; main nerves 6 or 7 pairs, curving, ascending, forking, obsolete on the upper, faint on the lower surface; length 3 to 4.5 in., breadth 1.3 to 1.75 in., petiole .3 to .4 in. *Male flowers* .2 in. in diam., in axillary fascicles of 6 to 12, their pedicels .15 in. long. *Calyx* minute, with 4 shallow rounded teeth. *Petals* 4, very much longer than the calyx, broadly ovate, membranous, slightly coherent by their bases, hypogynous. *Stamens* alternate with and longer than the petals, slightly adherent to them at the base; *filaments* subulate, much longer than the broad shortly ovoid suturally dehiscent anthers; *Rudimentary ovary* ovoid, compressed, *stigma* sessile. *Female flowers* not known. *Drupe*s globular, .3 or .35 in. in diam., the pulp copious; *pyrenes* 4, trigonous.

Perak: King's Collector, Curtis, No. 2091, Scortechini.

5. *ILEX MAINGAYI*, Hook. fil. Fl. Br. Ind. I, 605. A glabrous tree 20 to 30 feet high (60 to 80 *vide* Kunstler); young branches stout, lenticellate, dark-coloured. *Leaves* coriaceous, elliptic, narrowly elliptic-oblong or oblanceolate-oblong, sub-acuminate, the base narrowed; upper

surface shining, the lower dull and sub-glaucous; main nerves 10 or 12 pairs, sub-horizontal, faint on the lower, obsolete on the upper surface; length 4 to 5·5 in., breadth 1·35 to 2 in., petiole ·4 to ·65 in. *Male flowers* in pedicelled sub-umbellulate sub-racemose cymes about 1·25 in. long; the buds globular, less than ·1 in. in diam. *Calyx lobes* 4 in the male, 6 in the female, rounded, not ciliate. *Petals in the male* 4, broadly oblong; *stamens* longer than the petals and attached to their bases. *Female flowers* in short racemes; *petals* and *stamens* 6, hypogynous. *Ripe drupes* ovoid or globular, ·2 to ·25 in. in diam., grooved when dry; *pedicels* stout, as long as the drupes, pulp scanty; *pyrenes* 4 to 6, trigonous, thickly coriaceous; *stigma* sessile, swollen.

Penang, Maingay; (Kew Distrib.), No. 1021; Curtis, No. 2152. Perak; Scortechini, King's Collector.

6. *ILEX MACROPHYLLA*, Wall. Cat. 4331. A tree 15 to 30 feet high; young branches stout, pale, sometimes lenticellate. *Leaves* coriaceous, elliptic to elliptic-oblong, obtuse or sub-acute, entire, the base slightly narrowed; upper surface shining with the midrib depressed and the nerves obsolete; the lower dull, the 12 pairs of spreading nerves slightly prominent and interarching freely at some distance from the edge; length 4 to 6 in., breadth 2 to 2·5 in., petiole about ·5 in. *Cymes* dense, capituliform, often branching; their pedicels slender, axillary, longer than the petioles. *Flowers* ·15 in. in diam., 4-6-merous. *Calyx* with broad deep teeth. *Petals* broadly oblong, obtuse in the male flowers, united at the base; in the females, free and sub-equal. *Stamens* longer than the corolla and inserted on it. *Drupes* sub-globular, ·2 in. in diam., the *stigma* permanent and prominent; *pyrenes* about 8, trigonous.

Penang: Phillips, Wallich, Curtis, King's Collector. Malacca: Griffith, Maingay. Singapore: Ridley.

7. *ILEX CYMOSA*, Blume Bijdr. 1149. A glabrous tree 15 to 40 feet high; young branches slender, very pale. *Leaves* thinly coriaceous, elliptic-oblong to elliptic, the apex often shortly and bluntly acuminate, the base slightly narrowed or rounded, lower surface slightly glaucous; main nerves about 6 to 8 pairs, curved, ascending: length 2·5 to 4·5 in., breadth 1·35 to 2·5 in., petiole ·25 to ·35 in. *Cymes* solitary, pedunculate, branched and often paniculate, spreading, many-flowered, rather lax. *Flowers* ·1 in. in diam.; their pedicels slender, ·25 in. long. *Male flowers* 4-5-merous; the calyx lobes broad, rounded, ciliolate; *petals* broadly obtuse, about as long as the stamens. *Female flowers* with 5-6-merous calyx, and 6 to 8 short erect free concave slightly unequal petals; *ovary* globular-pyramidal; *style* short, thick; *stigma* large, hemispheric. *Drupes* globular, ovoid, crowned by the persistent style and stigma,

grooved when dry; the pulp scanty; *pyrenes* about 8, trigonous. Hook. fil. Fl. Br. Ind. I. 605. *I. singaporiana*, Wall. Cat. 6526. *Prinos cymosa*, Hassk. Tijdschr. Nat. Gesch. X, 140: Miq. Fl. Ind. Bat. I, pt. 2, 595. *Leucodermis javanica*, Planch. MSS.

In all the provinces except the Andaman and Nicobar Islands: common.—DISTRIB,—Sumatra, Java, Borneo, and probably in other islands of the Malayan Archipelago.

The short thick style is in the ovary often obscured by the stigma, but in the ripe fruit it is very apparent.

8. *ILEX SCLEROPHYLLA*, Hook. fil. Fl. Br. Ind. I, 606. *Leaves* thickly coriaceous, elliptic-oblong, obtuse, the edges entire, narrowed at the base into the very thick petiole; upper surface shining, the lower glaucous; length 5 or 6 in., petiole .5 in. *Female cymes* 1 in. long, sparingly branched, the peduncle very stout, the branches apparently 3-flowered; the pedicels stout, .25 in. long. *Calyx* with 5 rounded ciliolate lobes. *Petals* minute, free, unequal. *Ovary* ovoid, truncate, *stigma* sessile.

Malacca, on Mount Ophir: Griffith, No. 5013.

I have seen no specimens of this except Griffith's which is at Kew, and the above description is largely copied from Sir Joseph Hooker.

Description of a New Lathraea from the Eastern Himalaya.—By SURGEON CAPTAIN H. A. CUMMINS, *Army Medical Staff.*

[Read, 6th Feb.]

During an expedition to the Dichu Valley in August, 1893, a species of *Lathraea* was found growing in black soil in dense bamboo jungle. The connection with the roots of the bamboo (*Arundinaria aristata* Gamble) was not made out, but there was no other plant except this bamboo in its neighbourhood. The specimens could not be matched in the Calcutta Herbarium by Dr. King, Dr. Prain, or myself. Dr. Prain and I have since examined the material of *Lathraea* in the Kew Herbarium and have come to the conclusion that the specimens represent a very distinct new species most nearly related to *Lathraea clandestina* Linn. The systematic description of the new species is as follows:

LATHRAEA (§ *Clandestina*) *PURPUREA* Cummins; diffusa laxius ramosa, caulibus purpureis brevibus (3—4-unc.) gracilibus squamosis; squamis purpureis orbicularibus obtusis oppositis breviter petiolatis; floribus racemosis longiuscule pedicellatis, strictis, erectis; bracteis squamis caulinis conformibus sub-sessilibus; calyce cylindrico-campanulato hirsuto, 10-costato, indistincte 2-labiato, purpureo; corollae tubo pur-

pureo calyce sub-2-plo longiore (0.75 unc.), labio superiore purpureo galeato infra apicem utrinque subacute 1-dentato, inferiore 3-loba, albo-purpurascens venis purpureis ornato; staminibus didynamis inclusis filamentis anticis prorsus hirsutis quam posticos tertio summo tantum hirsutos distincte brevioribus; ovario 2-loba purpurascens apice plano-convexo, stylo simplici stigmate minimo, subexserto, loculis 10—15-ovulatis; capsula matura ignota.

In HIMALAYA ORIENTALI: Bhután, in valle Dichu, 12,000 p.s.m.; ipse! Haec evidenter arcte *L. clandestinae* Linn. (*Clandestinae rectiflorae* Lamk.) affinis, statim tamen differt statura minore, habitu laxiore, squamis petiolatis, planta tota fere concolore purpurea, nec caulibus, more *L. clandestinae*, squamisque luteis; calyce subintegro, nec distincte 4-fido, corollaque multo minore dentibus galea subapicalibus subacutis nec rotundatis, ovario apice fere plano et ovulis magis numerosis. Simulac *L. purpurea* caulibus brevibus squamis oppositis et floribus racemosis pedicellatis cum *L. clandestina* arcte convenit et cum hac specie sectionem *Clandestinam* satis bene limitatam indicat, a sectione *Eulathraea*, *L. squamariam*, *L. Rhodopeam* et *L. japonicam* includente et caulibus elongatis, squamis alternis, floribusque subsessilibus spicatis gaudente, facillime distincta. Sectio *Clandestina* tamen vix, uti dicant nonnulli, pro genere distincto habenda est: imprimis *L. japonica* habitum *L. squamariae* et *L. rhodopeae* cum floribus fere iis *L. clandestinae*, etsi multo minoribus, congruentibus, ostendit; iterumque *L. purpurea* ovulis quam in *L. clandestina* magis numerosis characteribus floralibus paullo ad *L. squamariam* accedit.

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Notes on the bleaching action of light on colouring matters.—By
ALEXANDER PEDLER, F.R.S., &c.

[Read, 6th Feb.]

That many colours fade when exposed to sunlight is a fact which is only too frequently observed, and which admits of no doubt. The colours which are thus bleached are almost invariably of organic nature, while coloured substances of inorganic character are, as a rule, practically unaffected by the action of light. The exact cause of this bleaching action of sunlight on organic colouring matter is, however, not well understood, and the experiments summarized in this note were conducted to add to the sum of our knowledge on this subject. They are, therefore, published not with the hope that they will set the question of the cause of the bleaching action of light at rest, but rather because they strengthen the conclusions which appear to have been arrived at by previous workers on this subject, and to exist in a more or less indefinite form in chemical literature.

That the subject of the bleaching of colours by light is not yet in a satisfactory condition may be judged by the following quotation from a work published as recently as 1890, by Professor E. Hjelt of Helsingfors, the well known Swedish chemist, who in his work on "General Organic Chemistry," in the chapter on the "Chemical Action of Light," writes* :—

"A considerable number of organic colouring matters lose their colours and become bleached by the action of sunlight; the process by

* General Organic Chemistry, by Hjelt. Translated by Dr. Tingle, 1890.

which the colours are destroyed is unknown. The action of light upon sensitive organic substances has been little investigated generally, but a number of single observations of an interesting nature have been lately made on this subject," etc. Hence it would appear there is still room for further experimentation on this subject.

The bleaching effect of sunlight or diffused light on colours or coloured fabrics, may be due to several causes. These causes may, perhaps, be summarized as follows:—

1. The bleaching may be due to a decomposing action of the light itself, unaided by any chemical action of the oxygen, carbon dioxide, moisture, ozone, etc., present in the air, or even, though not at all probable in the great majority of cases, the loss of colour may be due to the colouring matter itself being volatile.

2. The bleaching may be caused by the light inducing some chemical action due to the oxygen, carbon dioxide, moisture, ozone, etc., of the air.

3. Or in the case of dyed colours, the bleaching may be due to some action between the organic matters of the fabrics, and the colouring matters under the influence of light, or to a similar action accompanied by a chemical action due to the oxygen, carbon dioxide, moisture, etc., contained in the air.

4. Also the bleaching action may be due to changes connected with the growth of certain low forms of life, such as germinate when bodies in a favourable condition are freely exposed to ordinary air, in which such germs of life practically always exist.

To test these propositions early in 1891, the following sets of experiments were started.

A series of six colouring matters representing roughly different parts of a spectrum was taken. The colours were Purple as represented by neutral Litmus, Blue by Methyl Blue, Green by Methyl Green, Orange by Methyl Orange, Pink by Eosine, and Red by Rosaniline Acetate. Solutions of these substances were taken of definite strength (4 grams in a litre of water), so that they could be always reproduced when required. With these solutions specimens of pure cotton-wool as representing organic matter such as used in various dyed fabrics, and asbestos, representing an inorganic surface, which would have no practical chemical action on colouring matters, were dyed, and afterwards carefully dried. With these three sets of materials, *i.e.*, the solutions, the dyed cotton, and the dyed asbestos, the following principal sets of experiments were made:—

- A. The solutions were placed in tubes stoppered merely with cotton-wool, and were then exposed freely to the action of the air and

of any germs floating in the air at the time of preparation, and they were placed (*a*) one set in direct sunlight, (*b*) one in diffused daylight opposite a window with a north aspect, and (*c*) one set in perfect darkness. Fifteen experiments of this kind were started.

B. A set of solutions was taken as in A, except that the tubes containing the solution were thoroughly boiled for from 15 to 20 minutes in order to kill any germs likely to produce any action. While the solutions were still boiling the tubes containing them were plugged well with cotton-wool. Sets of these tubes were also exposed in parallel series (*a*) in direct sunlight, (*b*) in diffused daylight, and (*c*) in darkness. Eighteen experiments of this class were started.

C. Sets of the solutions were placed in tubes drawn out at one end and connected with the Sprengel mercurial pump. The solutions were boiled for 15 to 20 minutes, so as to free them from all dissolved oxygen and from all living germs, etc., and they were then completely exhausted of air and hermetically sealed. Sets of the solutions in these tubes were exposed (*a*) in full direct sunlight, (*b*) in diffused daylight opposite a north window, and (*c*) in total darkness. Eighteen experiments of this class also were started.

D. Specimens of cotton-wool, dyed with solutions of the six colours and then thoroughly dried at 100° C, were placed in test tubes, plugged at their mouths with cotton-wool, and then while thus freely exposed to air in its ordinary hygrometric condition, they were placed (*a*) in direct sunlight, and (*b*) in total darkness. Twelve experiments of this class were started.

E. Sets of dyed cotton-wool dried at 100° C, were placed in tubes rendered vacuous by the Sprengel pump, and then hermetically sealed and exposed (*a*) to direct sunlight, and (*b*) in total darkness. Twelve experiments of this class were started.

F. Specimens of asbestos were freed from organic matter and from any organisms, etc., by ignition, and dyed with the colours and carefully dried at 100° C. Specimens were placed in test tubes freely exposed to the air in its ordinary hygrometric state, and plugged with cotton-wool only. These were placed one set (*a*) in full direct sunlight, and (*b*) in total darkness. Ten experiments of this class were started.

G. Similar sets of asbestos specimens dyed with the colours and dried, were placed in tubes carefully exhausted by the Sprengel pump and hermetically sealed. One set was placed (*a*) in full direct sunlight, and a second set (*b*) in total darkness. Twelve experiments of this class were started.

The above sets of experiments were allowed to continue for periods varying in some cases up to nearly three years. In addition also some

sets of experiments were tried in which coloured substances were exposed to the action of sunlight after being moistened with water, and the bleaching under these circumstances compared with that produced by sunlight when the coloured bodies were kept free from water and only exposed to moist air. In all cases the presence of evaporating water rendered the bleaching *much* more rapid.

It will be seen that in the above list, A to G inclusive, no less than 97 experiments were started, and in addition to these a good many others were made, which are not reproduced in detail. Each experiment was examined every few days at first, and later on every few weeks, and the condition of the specimens was compared with freshly prepared specimens when necessary, and the results carefully recorded. Hence a large mass of facts was obtained. It will be seen that it would be impossible to describe the detailed results of each individual experiment, as this would take a large amount of space, nor indeed are the results of sufficient value to make the publication of the details necessary. Hence the main results only of the experiments are summarised in seven tables, A to G, which are printed below.

It may be convenient here to explain that the comparative results shown in tables A and B, are intended to differentiate between the causes referred to in 4 previously. The comparison of the results in B and C, is intended to differentiate between the causes referred to in 1 and 2. The comparison of the results given in D and E, and given in F and G, is again intended to differentiate between the causes referred to in 1 and 2, and finally the results of D and E together, compared with those of F and G together, will enable a conclusion to be obtained with reference to cause 3.

A. All colours in solution in water, placed in test tubes without boiling, and simply closed with a plug of cotton-wool.

Colour used.	IN TOTAL DARKNESS.			IN DIFFUSED DAYLIGHT, OPPOSITE A NORTH WINDOW.			EXPPOSED DAILY TO DIRECT SUNLIGHT.		
	2 months after.	10 months after.	14 months after.	2 months after.	10 months after.	14 months after.	2 months after.	10 months after.	14 months after.
Litmus	Unbleached.	Unbleached.	Unbleached.	Unbleached.	Unbleached slightly more purple.	Unbleached slightly more purple.	Began to bleach after few days, in 2 months quite bleached.	Bleached.	Bleached.
Methyl Blue	Unbleached.	Unbleached.	Unbleached.	Unbleached.	Unbleached.	Unbleached.	Unbleached.	Unbleached.	Partially bleached.
Methyl Green	"	"	"	"	"	"	Partially bleached.	No green colour left, solution blackish.	No green colour left.
Methyl Orange	"	"	"	"	"	"	Unbleached.	Result in- conclusive.	Experiment lost.
Eosine	"	"	"	"	"	"	Partially bleached.	Considera- bly bleached.	Almost colourless.

B. All colours in solution in water; solutions boiled for 15 minutes and while boiling the tube closed with a cotton-wool plug. Therefore the liquids had been to a great extent freed from germs, etc.

Colour.	IN TOTAL DARKNESS.			IN DIFFUSED DAYLIGHT OPPOSITE A NORTH WINDOW.			EXPPOSED DAILY TO DIRECT SUNLIGHT.		
	2 months after.	10 months after.	14 months after.	2 months after.	10 months after.	14 months after.	2 months after.	10 months after.	14 months after.
Litmus ...	Unbleached.	Unbleached.	Unbleached.	Unbleached.	Unbleached colour slightly purplish.	Unbleached colour slightly purplish.	Began to bleach after few days, after 2 months quite bleached.	Bleached.	Bleached.
Methyl Blue ...	"	"	"	Unbleached.	Unbleached.	Unbleached.	Unbleached.	Colour still strong.	Colour still strong.
Methyl Green ...	Solution almost colourless with black deposit. Sol. in HCl. giving green colour.	"	"	Unbleached.	Unbleached.	Unbleached.	Changed to a deep bluish black muddy fluid.	"	"
Methyl Orange ...	Unbleached.	Unbleached.	Unbleached.	Unbleached.	Unbleached.	Unbleached.	Unbleached.	Dried up.	Very small amount of colour left.
Eosine ...	Unbleached.	Unbleached.	Unbleached.	Unbleached.	Unbleached.	Still strong coloured.	Decided bleaching.	Decided bleaching but not complete.	

D. *Cotton-wool dyed with strong solutions of colours, and dried carefully, placed in test tubes plugged with cotton-wool, exposed therefore freely to air in ordinary hygrometric conditions.*

	Colour.	IN TOTAL DARKNESS.			EXPOSED DAILY TO DIRECT SUNLIGHT.		
		2 months after.	10 months after.	14 months after.	2 months after.	10 months after.	14 months after.
Litmus	...	Unbleached.	Unbleached.	Unbleached.	Largely bleached.	Entirely bleached.	Entirely bleached.
Methyl Blue	...	"	"	"	Bleached considerably.	"	"
" Green	...	"	"	"	Largely bleached.	"	"
" Orange	...	"	"	"	"	"	"
Eosine	...	"	"	"	Almost entirely bleached.	"	"
Rosaniline Acetate	...	"	"	"	Commencing to bleach.	"	"

E. Cotton-wool dyed with strong solutions of colours, then dried thoroughly and placed in tubes which were rendered vacuous by Sprengel Pump, and the tubes then hermetically sealed.

Colour.	IN TOTAL DARKNESS.				EXPOSED DAILY TO DIRECT SUNLIGHT.			
	2 months after.	10 months after.	14 months after.	35 months after.	2 months after.	10 months after.	14 months after.	35 months after.
Litmus ...	Unbleached.	Unbleached.	Unbleached.	Unbleached.	Still strongly coloured.	Still rather strongly coloured, but less so than when started.	Considerably bleached but still has light blue colour.	Considerably bleached but still has faint colour.
Methyl Blue	"	"	"	"	Apparently slight tendency to bleaching in parts.	Slight tendency to bleaching, colour not so brilliant.	Slight tendency to bleaching.	Still strongly coloured.
" Green	"	"	"	"	Considerably bleached.	Considerably bleached.	Practically entirely bleached.	Practically bleached.
" Orange	"	"	"	"	"	Distinctly bleached.	Entirely bleached.	Bleached.
Eosine ...	"	"	"	"	Very decided bleaching.	Almost entirely bleached.	Practically entirely bleached.	Bleached.
Rosaniline Acetate ...	"	"	"	"	Unbleached.	Unbleached.	Unbleached.	Unchanged.

F. *Asbestus* ignited for an hour to a full red heat and then cooled and dyed with strong solutions of various colours and dried. Samples placed in test tubes, the mouths of which were simply plugged with cotton-wool.

		IN TOTAL DARKNESS.				EXPOSED DAILY TO DIRECT SUNLIGHT.			
Colours.		2 months after.	10 months after.	14 months after.	35 months after.	2 months after.	10 months after.	14 months after.	35 months after.
Litmus	...	Unbleached.	Unbleached.	Unbleached.	Unbleached.	Considerably bleached.	Entirely bleached.	Entirely bleached.	
Methyl Blue	...	"	"	"	"	Almost unchanged.	Almost unchanged.	Almost unchanged.	Very little changed.
"	Green	"	"	"	"	Partially entirely bleached.	Entirely bleached.	Entirely bleached.	
"	Orange	This colour does not dye Asbestus at all well. Hence no experiments were made.							
Eosine	...	Unbleached.	Unbleached.	Unbleached.	Unbleached	Almost bleached.	Practically bleached.	Entirely bleached.	
Rosaniline Acetate	...	"	"	"	"	"	"	Bleached.	Bleached.

G. Asbestos ignited for an hour to a full red heat and then cooled and dyed with strong solutions of various colours and dried. Samples placed in tubes, exhausted by Sprengel Pump and then sealed hermetically.

	IN TOTAL DARKNESS.				EXPOSED DAILY TO DIRECT SUNLIGHT.			
	2 months after.	10 months after.	14 months after.	35 months after.	2 months after.	10 months after.	14 months after.	35 months after.
Colours.								
Litmus...	Un-bleached	Un-bleached	Un-bleached	Un-bleached	Un-bleached	Un-bleached	Un-bleached	Un-bleached
Methyl Blue	"	"	"	"	"	"	"	"
" Green	"	"	"	"	Small amount of bleaching	Slight amount of bleaching	Slight bleach-ing action	Still strongly coloured
" Orange	This colour does not dye Asbestos. Experiments therefore not tried.							
Eosine ...	Un-bleached	Un-bleached	Un-bleached	Un-bleached	Un-bleached	Un-bleached	Un-bleached	Un-bleached
Rosaniline Acetate...	"	"	"	"	Colour not quite so brilliant but no bleaching.	Colour not quite so brilliant but not bleached.	Colour not quite so brilliant.	Still very strongly coloured.

The general results shown in the foregoing seven tables may be fairly accurately summarized in the following small table.

General results of experiments on the bleaching action of Sunlight on Colours.

	In Dark- ness.	In Diffused Day- light.	In Sun- light.
	Un- bleached	Un- bleached	All bleached
Solution of colours exposed to air. Solution unboiled...			
„ „ „ „ boiled ...	„	„	Partial bleach- ing.
„ „ in vacuô „ ...	„	„	Un- bleached
Colours on cotton-wool <i>in air</i> , in ordinary hygrometric state	„	„	Bleached
„ „ in vacuô	„	„	Partial bleach- ing.
„ on asbestos <i>in air</i> , in ordinary hygrometric state	„	„	Bleached
„ „ in vacuô	„	„	Un- bleached

The following general conclusions appear to follow from the above experiments taken in conjunction with a number of others which cannot be described in detail:—

1. Organic colours, both in solution in water or on dyed fabrics inorganic or organic, exposed freely to the action of air in the presence of the usual atmospheric conditions of moisture, etc., are practically unacted on in darkness even when exposed to these conditions for nearly three years.

2. Organic colours in the conditions mentioned in 1, are also practically unaffected by diffused daylight opposite a north window, even for the same period of nearly three years.

3. Organic colours in the conditions mentioned in 1, when exposed to the direct rays of the sun are all bleached, but with varying rapidity.

4. In the absence of air (moisture, etc.) strong sunlight, even for a period of three years, has practically no bleaching action on organic colours either in solution in water or used as dyes on inorganic fabrics. In the case of organic fabrics partial bleaching occurs.

5. It hence follows from 4 that the bleaching is not due to any action of light alone or to any volatility of the colouring matters.

6. The bleaching of colours takes place less rapidly when the colours are in solution than when they are dyed on fabrics.

7. The bleaching of colours in solution takes place less rapidly if the living germs or organisms in the solutions are destroyed by boiling than if they be not so destroyed.

8. The bleaching action of light appears to be more powerful if the colours are in contact with an organic fabric than if they are used to colour inorganic materials (asbestos).

9. The bleaching action of light in presence of air is much facilitated by the presence of moisture in contact with the colours and more particularly of *evaporating* water in contact with dyed fabrics.

10. There can therefore be little doubt that the bleaching action of light on ordinary organic colouring matters is usually due to oxidation. This oxidation when facilitated by evaporating water is probably or almost certainly due to the action of ozone, for Gorup von Besanez has shown that ozone is invariably formed when water evaporates in the air.* It therefore appears highly probable also that the action of the sunlight on the oxygen of the air *brings it into an active condition* (resembling perhaps that of ozone), and that the bleaching of organic colours is due to oxidation from this cause; for ordinary oxygen uninfluenced by sunlight does not bleach.

No. 3. *Notes on, and drawings of, the animals of various Indian Land Mollusca (Pulmonifera).*—By LIEUT.-COLONEL H. H. GODWIN-AUSTEN, F.R.S., F.Z.S., &c.

[Read 3rd April.]

Plate VII.

Continued from J. A. S. B., Pt. ii., Vol. LI, 1882, p. 71.

After the long lapse of 12 years since publishing my second paper (in 1882), on the drawings of Indian Land-Mollusca made by native artists under the superintendence of Ferdinand Stoliczka, I now forward a third, with the hope that it will lead some of our younger naturalists to make notes and drawings, and if possible dissections, of Indian species, so that they may be more accurately placed in generic position.

The first I have to notice and reproduce on Plate vii, fig. 1, is No. 29 of Ferd. Stoliczka's drawings, a very careful and accurate one of *Helix oethoplax*, with his MS. note attached,—“Asalu; sent down by Major Godwin-Austen.” In 1869 I was surveying in the Naga Hills and

* Ann. Chem. Pharm. clxi. 232; also Roscoe and Schorlemmer Treatise on Chemistry Vol. I., p. 200.

was able to send a large number of species alive to Calcutta, by packing them in hollow green bamboos. In this way they travel well. No wet moss is necessary, and should be excluded. Green leaves or grass are best, and with the present rapid transit they might in the autumn months reach England in safety. A collection made in Aden reached me all in a living state, and survived a long time, and bred, being viviparous.

Sub-family *Helicea*.

Sub-Genus *EUCOCHLIAS*, Theobald.

Catalogue Land and Freshwater Shells of British India, August 1876, p. 26. No description is given, so I add one below.

Type of genus Helix oethoplax, Benson. Plate VII. fig. 1.

Annals and Mag. Nat. Hist., Sept. 1860. from Pegu, (Theobald).

Description of Genus.

Animal.—A true *Helix*; jaw grooved (according to W. T. Blanford, *vide* Nevill's Hand List, p. 81); foot very flat and oval when fully extended; tentacles rather thick, surface granulate, no defined pallial line.

Shell.—Large, solid, closely umbilicated, depressed, convex above and below, keeled, aperture broadly lunate, peristome slightly expanded, reflected near the short solid columella, margins joined by a slight callus. Ranges from the North Khasi Hills eastward. Theobald gives Moyang Khasi Hills as the habitat, and as the type shell described by Benson came from him, Pegu, I think, must be a mistake.

Description of *H. oethoplax* from Moyang, northern side of the Khasi Hills, in my note book: "of a rich dark madder brown colour, base of foot and its narrow edge of same colour but lighter, when partially withdrawn into shell the foot is much flattened and crinkled up along the margin, foot rounded at extremity with no gland above." In the drawing of the animal there is a well marked pale line on the dorsal side of the neck, formed by three strong parallel rugæ or lines, broken up into large tubercles.

This is a very distinct genus, and the animal of very striking and beautiful appearance, if we can apply such a term of praise to a snail, and it is unlike any other *Helix* I have seen in this part of India. It is very rare and local on the North-East Frontier, and I never obtained it on the south of the water-parting. I have it from the north of the Garo Hills, Moyang in the Khasi Hills, and Asalu in the Naga Hills.

Nevill suggests in his Hand List, that it "is probably closely allied to *Stylodon* (*Stylodonta*?) possibly not separable." This can only be settled after a comparative examination of the anatomy of the animals. It would certainly be a very interesting fact with regard to distribution, to find a genus of the Seychelle Islands extending to Eastern India. I hope before long to receive specimens in spirit from the Khasi Hills. *E. illustris* Pfr. from Cambodia is very close to *E. octhoplax*, and Nevill includes *bougainvillei*, Pfr. from the Solomon Islands. Benson taking shell characters alone into consideration and, no doubt, thinking it one of the *Zonitidæ*, placed it near *cycloplax* of Sikkim.

It grows to a large size. My finest specimen measures, major diam. 61·0, minor diam. 51·0, alt. axis 25·0 millim.

Benson's type measures, major diam. 46, minor diam. 26, alt. axis 25·0 millim.

Since commencing this paper I have received another and distinct species of this genus, from my old friend and former assistant in the Indian Survey Department, Colonel Woodthorpe, C.B., who got it on the eastern frontier of Burmah, beyond Fort Stedman; and I am about to describe it in the *Annals and Magazine of Natural History*. It is preserved in spirit, so that I have been enabled to examine its anatomy. It appears to me far nearer to such forms of *Cochlostyla* as *C. cineracea*, Semper; and if I should be correct in this view, it would be an interesting extension westward of that group of shells.

Genus PLECTOPYLIS, Benson, Type *achatina*, Gray.

Annals and Mag. Nat. Hist., April 1860.*

This genus has been treated of by Mr. W. T. Blanford, in *Annals and Mag. Nat. Hist.*, April 1861, and J. A. S. B., Vol. XXXIV, 1865, p. 73. In the P. Z. S., November 1874 and January 1875, and in this Journal for 1879, a number of species both old and new were described and figured with some detail by myself, especially as regards the very peculiar and characteristic internal plication.

This genus is anatomically described most admirably by F. Stoliczka from the type species, in this Journal for 1871, p. 217. How far it differs from *Corilla* of Ceylon, to which it must be closely allied, has still to be made out; as also the true affinity with *retifera* from the Nilgherries, and with *clathratula* from Ceylon, which is still more remote.

Stoliczka, from his observation and knowledge of the animal, considered this genus related to *Clausilia*. The genus is ovo-viviparous as observed in three species—*achatina*, *cyclaspis* and *pinacis*—jaw grooved.

* Fig. 56 of Stoliczka's Drawings, Moulmain, Pl. vii. fig. 5.

Helix (*Plectopylis*) *minor*, Godwin-Austen. Plate VII. figs. 3 and 3a. (No. 51 of MS. Stol.).

Described in *Annals and Mag. Nat. Hist.*, August 1879. Darjiling?

I give below a copy of the original description and add the dimensions then omitted. I now also give magnified drawings of the hair-like epidermal fringe in this species (fig. 3a) and in another allied to it, also from Darjiling, *P. pinacis* (fig. 2a), in which it is seen how greatly they differ, being regular and symmetrical in size and diameter and perfectly rounded at the end in *P. minor*; while in the other it is irregular flattened and divided near the extremity into two or more points, which are again split at the end. This distinction held good in both young and old specimens and was not the result of age or weathering.

It may be interesting here to refer to Plate I, J. A. S., B., 1879, where the epidermal fringe of *P. brachydiscus* is given, shewing another and very distinct form of hairy fringe.

Description. "Shell sinistral, openly umbilicated, discoidal, hirsute. Sculpture coarse with irregular transverse ribbing, near the apex fine and regular ribbing; color pale umber, with regularly disposed broadish transverse bars of sienna-brown: spire flat, only the first three whorls slightly rising above the others; suture shallow. Whorls five, sub-angular on the periphery of the last, which has four distinct rows of short hairs, entire at the point. Aperture oblique, slightly descending; peristome lunate, slightly flattened on the upper outer margin, but very little reflected, the inner margins connected with a distinct bridge on the parietal side. The parietal vertical lamina is simple, with no distinct horizontal plica below it, as in *macromphalus*; the palatal plicæ are six in front, four behind, the basal one in front thin, and longer than the others."

Major diam. 0·20 in., minor diam. 0·17 in. alt. axis 0·09 inch.

" " 5·0 mm. " " 4·5 mm. " " 2·3 mm.

The animal in Stoliczka's drawing now before me is coloured dark brown, and being a young shell is enlarged. In my MS. notes I find a specimen of *P. macromphalus* from Shillong in the Khasi Hills thus described: "Animal with lower tentacles represented by two small hemispherical protuberances, body all pale with tinge of orange on head and neck: extremity of foot pointed." I must now correct an error in my paper in the *Annals and Magazine of Natural History* for 1879, where I say that in Stoliczka's drawing it is represented of a pink color.

The animal of *P. plectostoma*, Bs., from Teria Ghat, is thus described in my field book:—"Animal: foot short, of a pale brown yellow

tint, neck and tentacles the same slightly darker; tentacles short, the oral very small; no gland on foot, which is pointed."

Helix (*Plectopylis*) *achatina*. Gray. Plate VII. fig. 5.

Moulmain? (fig. 56 of MS. Stol.)

Description from drawing.—Animal with long slender eye-tentacles, the oral of ordinary size; colour of tentacles and neck dark umber brown, pale towards the extremity of the foot, which is pointed, very minutely speckled with brown throughout: a broad pale pedal margin, or fringe, distinctly defined by a line of oblong tubercles apparently similar to what is seen in the *Zonitidæ*, but there is no mucous gland at the extremity of the foot.

Helix huttoni, Pfr.

(Fig. 23 of the drawings: no remarks.)

No locality is given; but as the drawing was made on a piece of cardboard on which were two other shells from Darjiling, I imagine it was collected there. I note also that Mr. G. Nevill in his Hand List, gives 30 specimens in the Indian Museum from Darjiling, and in Mr. W. T. Blandford's collection are specimens from the same locality.

In the drawing the animal is shewn nearly pure white including the tentacles, with a pointed extremity to the foot, the pedal margin distinct.

Now true *Helix huttoni*, which was described from the N. W. Himalaya, is very differently described in my Notes on specimens from Waverley, Mussoorie Hill Station:—"Animal light brown, tentacles long and dark brown;" it is doubtful therefore, whether the N. W. Himalayan and the Darjiling species are identical. The former also have a much more hairy, rougher epidermis than those so called *huttoni* from the latter place and the Khasi Hills.

Mr. Theobald placed this species in the genus *Fruticicola* Helder (= *Hygroucia*, Risso, *apud* Adam's genera) of which the European *H. hispida* is the type, and to which in shell structure it closely assimilates. It is just as well in our present state of ignorance of the animal to leave *H. huttoni* in the sub-genus *Fruticicola*, of which the animal is known, rather than in *Plectotropis* of Albers founded on the shell only (of *elegantissima*) from the Liew-Kiew Islands, or in *Planispira*, Beck (type *zonaria*) from Celebes (= *Eurystoma*, Albers, type *vittata*) from Ceylon. We should also be guided somewhat by the known, or rather reputed distribution of *Fruticicola*; which ranges from the European region into Asia and is represented by *rufispira*, Von Martens, in Turkestan; by *plecto-*

tropis and *phæozona*, V. Martens, Sásak Taka; *dschulfensis* in Persia; and by *bactriana*, Hutton, from Kandahar; which carries it close into the Himalayan range. Nevill also describes one (*mataianensis*) from Mataian, Sind Valley, Kashmir.

Helix similaris and *bolus* which have been placed in the genus *Fruticicola* have, I should say, but very slight connection with it. The list of species in *Planispira* and *Plectotropis*, as given by Geoffrey Nevill in the Hand List, will require very considerable revision. In an unpublished copy of his Hand List, greatly corrected, which he was good enough to give me before his early death, he has put *H. huttoni* in *Aegista*, a genus of Albers, who placed in it *Helix oldhami* from Burma, a very different form as regards the aperture of the shell.

Until we know the anatomy of *Eurystoma vittata*, *Plectotropis elegantissima* and *Aegista oculus* from China, it is unsatisfactory work trying to place these Indian species under any of these three genera; and it is very difficult to get hold of the type species in spirit.

Sub-genus *Planispira*, Beck.

(Type *Zonaria*, Müller from Celebes.)

Eurystoma, Albers (on shell alone), type *H. vittata*, Ferussac, from Madras.

Semi-cornu, Klein.

H. (? Planispira) propinqua, Pfr. Plate VII, fig. 4.

Central India (fig. 40 of MSS. Stol.)

The remarks which I have made regarding the location of Indian species in this genus, applies here to this one. An examination lately made of the anatomy of some Southern Indian Shells (and I am expecting some more material) shews that a number of them are very closely related, although they do not shew it in shell character.

Description of Plate.

- Fig. 1. Animal of *Helix* (*Eucochlias*) *octhoplax*, Benson.
- 2. Animal of *Helix* (*Plectopylis*) *pinacis*, Benson.
- 2a. Epidermal hairs on keel magnified.
- 3. Animal of *Helix* (*Plectopylis*) *minor*, G.-A.
- 3a. Epidermal hairs of same magnified.
- 4. Animal of *Helix* (*Planispira*?) *propinqua*. Pfr.
- 5. Animal of *Helix* (*Plectopylis*) *achatina*. Gray.

Materials for a Carcinological Fauna of India. No. 1. *The Brachyura Oxyrhyncha.* — By A. ALCOCK, M.B., C.M.Z.S., *Superintendent of the Indian Museum.*

Plates III–V.

[Received 11th April:—Read 1st May.]

It was the intention of my immediate predecessor and late friend James Wood-Mason to write a Descriptive Catalogue of the collection of Crustacea in the Indian Museum.

To this end he had collected a very comprehensive Crustacean literature, and had set in motion a scheme for extracting in a handy form the references contained therein.

He had also roughly sorted the whole collection into its component great-groups, and had made a large number of identifications.

In short he had, before his sad and premature death, collected the raw material for, and sketched the broad foundations of, a work that, had he lived on in unimpaired health, might have been a fit companion and sequel to the classical volumes of that great naturalist Henri Milne-Edwards.

Only in the case of the *Stomapoda* had he gone further than this; and I am now preparing to edit, from the rough MS. notes at my disposal, his account of a part of this Order as represented in the collection of the Indian Museum.

The present paper is the first of a series in which I hope to be able to turn to some—though inadequate—account the mass of material accumulated by my predecessor.

My own work in this paper has been to complete, to arrange systematically, to collate, and to verify the available references to the literature of the Oxyrhyncha; to determine about 70 per cent. of the Indian species contained in the collection of the Indian Museum; to prepare the generic diagnoses and the descriptions of all the species mentioned; and to work out, to the best of my ability, keys—which I hope may be of use to naturalists in India—to sub-families, genera, and species.

In the arrangement of the group as a whole, I have been guided and assisted by the *Revision of the Maioid Crustacea*, by Mr. E. J. Miers,

in the Journal of the Linnæan Society (Zoology), Vol. XIV. 1879; and by the same author's *Report on the 'Challenger' Brachyura*; and to these important works I have here to acknowledge my great indebtedness.

I have not, however, been able to give my complete adherence to the classification proposed by Mr. Miers, further than to accept the previously adopted division of the Oxyrhyncha into two groups of equal value—the Maioids and the Parthenopoids. To these groups, I would, following Dr. Claus, give the rank of families—*Maiidæ* and *Parthenopidæ*.

But to further sub-divide a group like the Maioids—in which we find, as Miers himself remarks, every reasonable gradation of form from *Stenorhynchus* to *Pericera*—into separate families, as is done by Miers, involves, I think, an unnecessary and unphilosophical interference with the meaning of the term 'family.'

Nor is anything gained, from the point of view of the practical systematist, by establishing families which overlap in all directions.

I am so much indebted to the works of Mr. Miers, that I should be loath to criticize them in any but a friendly spirit. But it seems to me that while Mr. Miers has recognized the value of certain characters round the developments and modifications of which the Maioid Crabs easily cleave into most natural groups, he has proceeded in practice to ignore in great measure the value of his own generalization.

It appears to me that Mr. Miers' families of *Mainea* consist each of a quite natural nucleus hidden in a loose artificial wrapping.

Beginning with the *Inachidæ* of Miers, we find a natural group, typified by such forms as *Leptopodia* and *Inachus*, linked with forms like *Anamathia*, *Xenocarcinus*, *Huenia*, *Pugettia*, *Acanthonyx*, *Doclea* and *Stenorionops*, none of which are any more nearly related to *Leptopodia* and *Inachus* than they are to any other Maioid.

In the *Maiidæ* of Miers again, we find a most arbitrary jumble of forms. Amid the confusion, however, we can discern a large natural nucleus, typified not, it is true, by *Maia*, but by such forms as *Egeria*, *Chionæcetes*, *Pisa*, *Naxia*, etc.; but these are no more nearly related to *Maia*, *Paramithrax*, *Schizophrys*, *Criocarcinus*, and *Micippa* than they are to any other Maioid.

The third family, *Periceridæ*, is even more bewildering; but as Miers himself, in his *Report on the 'Challenger' Brachyura*, has distributed many of his original Periceroid genera among the other two families, it would be unjust to enter into any detailed criticism of this family now.

The classification proposed in this paper is in many respects a reversion to the older authors.

For a most interesting and instructive historical and critical review of the Oxyrhyncha as a whole, I would refer to the Introduction of Miers' paper, already cited, in the Journal of the Linnæan Society, Zoology, Vol. XIV. 1879, pp. 634-642.

I have only to add that as almost all the new species described in this paper have been dredged by the 'Investigator,' they will be figured in next year's issue of the "Illustrations of the Zoology of the 'Investigator.'"

Tribe OXYRHYNCHA or MAIOIDEA.

Oxyrinques, *Oxyrinchi*, Latr. Hist. Nat. Crust. et Insect. tom. VI. p. 85.

Oxyrhinques et *Canceriens Cryptopodes*, Milne-Edwards, Hist. Nat. Crust. tom. I. pp. 263, 368.

Maiioidea or *Oxyrhyncha*, Dana, U. S. Expl. Exp. Crust. Pt. I. pp. 66, 67 and 75.

Oxyrhyncha, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 634; and 'Challenger' Brachyura, p. 2.

Carapace more or less narrowed in front, and usually produced to form a rostrum: branchial regions considerably developed, hepatic regions small. Epistome usually large; buccal cavity quadrate, with the anterior margin usually straight. Branchiæ almost always nine in number on either side*: their efferent channels open at the sides of the endostome or palate. Antennules longitudinally folded. The palp of the external maxillipeds is articulated either at the summit or at the antero-internal angle of the meropodite. The external genitalia of the male are inserted at the bases of the fifth pair of trunk-legs.

The Oxyrhyncha may be sub-divided into two families, namely:—

(1) the *Maiidæ*, in which the basal joint of the antennæ is well developed, and in which it is exceptional to find the chelipeds vastly longer than the other legs;

and (2) the *Parthenopidæ*, in which the basal joint of the antennæ is very small, and is embedded between the front and the floor of the orbit; and in which it is exceptional not to find the chelipeds vastly longer and vastly more massive than the other legs.

* *Encephaloides* is the only Oxyrhynch known to me in which the branchiæ are less than nine in number on either side: in *Encephaloides* the reduction, both in size and number, of the anterior branchiæ seems to be due to the enormous development of the four posterior branchiæ.

Height of figure, from surface of pedestal to surface				
of top-knot ...	...	...	...	10''·50
Diameter of aureole ...	...	...	...	5''·75

The inscription consists of a single line of ancient Nāgarī characters incised on the convex moulding of the pedestal, and running round all four sides. The characters are in some respects peculiar in form, and a few of them are difficult to read, though well-preserved. They are of an early type, and, we should think, not later than A.D. 300. The facsimile, prepared from an inked *estampage*, (Plate IX) will enable the reader to form his own opinion as to their age. The convexity of the moulding, and the shallowness of the engraving cause some difficulty in obtaining a copy of the inscription, which reads as follows:—

*Dēyadharmōyaṃ upāsikā Bēdi—
kāyā yadatra punyaṃ
tad bhavatu mātā pitrō sarvva satvā—
nāṃ anuttara jñānavāptayē.*

“This is the meritorious gift of the female worshipper Bēdikāyā; whatever religious merit there is in it, let it be for the attainment of supreme knowledge by her father and mother, and by all sentient beings.”

This formula, with some slight modifications, is found in three of the later inscriptions in the caves at Kuḍā, forty-five miles south of Bombay.

The earliest inscriptions at Kuḍā, which may perhaps date from the first century B.C., are in the Pālī language and simply record that such and such an article is the gift (or “meritorious gift”) of so and so. The prayer that the merit of the gift may be for the attainment of supreme knowledge by the donor’s parents and all sentient creatures is wanting. That prayer is found in the later inscriptions, which, like those on Dr. Hoey’s statuettes, are in the Sanskrit language. The Buddhists of the earlier Hīnayāna sect used Pālī. The members of the later Mahāyāna sect used Sanskrit.

In order to show how closely the inscriptions on the statuettes follow the Kuḍā pattern, we quote No. 7 of the Kuḍā inscriptions:—

*Dēyadharmōyaṃ Čākhyōpā—
sikā Vyāghrakāyā yad atra
punyaṃ tadbhavatu mātāpitṛpū—
rvvaṅgamāṃ kṛtvā sarvvasatvānāṃ anuttara jñā—
nāvāptayē.¹*

¹ The Kuḍā inscriptions are discussed by Dr. Burgess (assisted by Dr. Bühler) in Volume IV. of the *Archæological Survey of Western India*, ‘Report on the Bud-

The inscription of the statuette of the seated Buddha (No. II.) includes (excepting the word *kṛtvā*) the portion of the formula which has been omitted from the dedication of the standing image.

This second statuette, that of the seated Buddha (Plate X), is almost destitute of merit as a work of art, and is an ordinary Indian production of conventional pattern. Buddha is exhibited squatting, with the soles of his feet turned up, and holding the little finger of his left hand between the first finger and thumb of the right hand. The shoulders are square, and the general appearance of the image resembles that of mediæval Jain statues. But, unlike the Jain images, Buddha is not nude. He is clothed in close-fitting garments, the existence of which is indicated only by the opening for the neck, and the termination of the sleeves and drawers. No attempt is made to express the folds of the clothing. The hands are stiffly and clumsily moulded, and the face is expressionless. The æsthetic demerits of the work are so striking that, if it were not inscribed, a late date might be assigned to it. But the characters of the inscription, though somewhat later in form than those on the pedestal of the standing figure, are probably not later than A.D. 400, and certainly not later than A.D. 500.

A rectangular plate, surmounted by a circular aureole, is attached to a projection at the back of the head.

The principal dimensions are:—

Height, including pedestal, to surface of top-knot	...	12''·50
Total height to top of aureole	... ..	14''·00
Height of figure, from surface of pedestal to surface of top-knot	... ..	9''·50
Diameter of aureole	... ..	5''·40

The inscription is in two lines on the front moulding only of the pedestal. (Plate IX.) Some of the letters are difficult to read, and a few are to us doubtful. The record is as follows, subject, perhaps, to some slight correction.

¹ *Deyadharmmōyaṃ Guptavaṃṣōdita Ṣrī Hariḍāssya rajñī Mahā-dēvyāḥ yadatra puṇyaṃ tad bhavatu.*

² *Sarvva satvānām mātā pitṛ pūrvāṅgamaṇām anuttarapada jñān-ārāptayē.*

dhist Cave Temples and their Inscriptions. (London, 1883) pp. 12–14, 85, 86; Plates XLV, XLVI. Nos. 7, 8, 9 of Plate XLV. resemble the dedications of the statuettes in language, and to a large extent in alphabetical characters. They are supposed to date from the fifth or sixth century A.D. The Mathurā inscription of the Gupta year 135 (A.D. 453) has the formula *Dēyadharmmōyaṃ vīhārasvaminīyā Dēvtāyā yadatra puṇyaṃ tad bhavatu mātāpitṛōḥ sarvvasattvānāṃca anuttara-jñānāptayē.* (*Fleet*, p. 263.)

joint is broad, and either has, or has not, one or both of its anterior angles armed with a strong spine. The merus of the external maxillipeds usually has its antero-external angle strongly dilated; and the buccal frame is often much wider in front than behind.

Alliance 3. *Periceroida*. The carapace is broadened anteriorly by the outstanding, often tubular, orbits: the orbits are formed (1) by an arched supra-ocular hood, or semi-tubular horn, (2) by a hollowed post-ocular process, and (3) by a remarkable broadening, or by a prolongation, of the anterior part of the basal antennal joint; and they afford complete concealment to the retracted eye. The rostrum is often more or less deflexed.

I am afraid that this last sub-family will, at first, meet with hostile criticism; but I feel pretty sure that it is a natural group. For, taking the nature of the orbits, eyes, and basal antennal joint as the primary bond of relation, we find, if we exclude the aberrant *Stenocionopoda*, a regular gradation from the imperfect orbit and the narrower basal antennal joint of *Maia*, through the more perfect orbit and broader basal antennal joint of, e.g., *Micippa thalia* and *Micippa cristata*, to the perfect tubular orbit of *Microphrys* (if *Microphrys cornutus* be the type), *Tiarinia* and *Macrocaeloma*. The *Stenocionopoda* again are linked on, through *Picrocerus* and *Picroceroides*, to the *Periceroida*; and, on the other hand, through *Criocarcinus* to the Maioid *Chlorinoides*.

The following is a list of the genera of Maioid Crabs, so far as known to me, arranged in accordance with the afore-proposed classification. Within each sub-family the genera are arranged alphabetically. Indian genera are printed in roman type, and all genera known to me by autopsy are marked with an asterisk.

Complete references are not given; but only references to the best diagnoses with which I am acquainted. The bibliography of Indian genera will be found in the sequel.

Family Maiidæ.

Sub-family I. *Inachinæ*.

ALLIANCE I. LEPTOPODIOIDA.

* *Achæus*.

Achæopsis, Stimpson, Proc. Ac. Nat. Sci. Philad., 1857, p. 219.

? *Anisonotus*, A. Milne-Edwards, Miss. Sci. Mex. Crust. I. p. 195.

* *Camposcia*.

Cyrtomaia, Miers, 'Challenger' Brachyura, p. 14.

* *Echinoplax*.

Ergasticus, A. M.-E., Miers, 'Challenger' Brachyura, p. 29.

Ericerus, Mary J. Rathbun, Proc. U. S. Nat. Mus., Vol. XVI, p. 223.

Leptopodia, Leach, Zool. Miscell. II. 15 : Milne-Edwards Hist. Nat. Crust. I. 275 (Synonymy see Miers, Journ. Linn. Soc. Zool. XIV. 1879, p. 643).

Lispognathus, A. Milne-Edwards, Bull. Mus. Comp. Zool. Vol. VIII. 1880-81, p. 9 ; and Miss. Sci. Mex. Crust. I. p. 349 : and Miers 'Challenger' Brachyura, p. 27.

* *Macrocheira*, de Haan, Faun. Japon. Crust., p. 88 : and Miers, 'Challenger' Brachyura, p. 33.

Metoporaphis, Stimpson, Ann. Lyc. Nat. Hist., New York, Vol. VII. 1862, p. 198.

* *Oncinopus*.

Pactolus, Leach, Zool. Miscell. II. 19 : Milne-Edwards, Hist. Nat. Crust. II. 189 .

* *Paratymolus*.

* *Platymaia*.

Pleistacantha, Miers, P. Z. S., 1879, p. 24.

Podochela, Stimpson, Ann. Lyc. Nat. Hist., New York, Vol. II. 1862, p. 194, (Synon. *Podonema*, Stimpson, Bull. Mus. Comp. Zool., Vol. II. 1870-71, p. 126).

* *Stenorhynchus*, Lamk., Milne-Edwards, Hist. Nat. Crust. I. 278 (Syn. Miers, Journ. Linn. Soc. Zool., XIV. 1879, p. 643).

New genera :—*Lambrachæus*, *Physachæus*, *Grypachæus*.

ALLIANCE II. INACHOIDA.

Anacinetops, Miers, Ann. Mag. Nat. Hist. 1879, Vol. IV. p. 3.

Anasimus, A. Milne-Edwards, Miss. Sci. Mex. Crust. I. p. 360.

Anomalopus, Stimpson, Bull. Mus. Comp. Zool. II. 1870-71, p. 124.

* *Apocremnus*.

Arachnopsis, Stimpson, Bull. Mus. Comp. Zool. II. 1870-71, p. 121.

Batrachonotus, Stimpson, Bull. Mus. Comp. Zool. II. 1870-71, p. 122.

* *Collodes*.

* *Encephaloides*.

Erileptus (? = *Anasimus*), Mary J. Rathbun, Proc. U. S. Nat. Mus. Vol. XVI. 1893, page 226.

??? *Eucinetops*, Stimpson, Ann. Lyc. Nat. Hist. New York, Vol. J. II. 21

VII. 1862, p. 191 (more probably, as Stimpson himself suggested, allied to *Micippa*).

Euprognatha, Stimpson, Bull. Mus. Comp. Zool. II. 1870-71, p. 122.

Eurypodius, Guérin; Milne-Edwards, Hist. Nat. Crust. I. 283.

Gonatorhynchus, Haswell, Cat. Austral. Crust., p. 10.

Halimus, Latr., Edw., Milne-Edwards, Hist. Nat. Crust. I. 340.

* *Inachus*, Fabr., Edw., Milne-Edwards, Hist. Nat. Crust. I. 286.

* *Inachoides*.

* *Microhalimus*, Haswell, Cat. Austral. Crust., p. 7.

Neorhynchus, A. Milne-Edwards, Miss. Sci. Mex. Crust. I. p. 186, (= *Microrhynchus*, Bell, P. Z. S., 1835, p. 88, and Trans. Z. S. II. 1841, p. 40).

Oregonia, Dana, U. S. Expl. Exp. Crust. I. p. 105.

Pyromaia, Stimpson, Bull. Mus. Comp. Zool. II. 1870-71, p. 109.

* *Trichoplatus*, A. Milne-Edwards, Ann. Sci. Nat. (6) IV. 1876, Art. 9, p. 2.

Sub-family, II. *Acanthonychidæ*.

* *Acanthonyx*.

Antilibinia, Macleay, in Smith's Ill. Zool. S. Africa, p. 56.

Cyclonyx, Miers, Ann. Mag. Nat. Hist., 1879, Vol. IV. p. 6.

Dehaanius, Macleay, in Smith's Ill. Zool. S. Africa, p. 57.

Epialtus, Milne-Edwards, Hist. Nat. Crust. I. 344.

Eupleurodon, Stimpson, Ann. Lyc. Nat. Hist. New York, Vol. X. 1874, p. 98.

Goniothorax, A. Milne-Edwards. Bull. Soc. Philom. (7) III. 1878-79, p. 103.

* *Huenia*.

Leucippa, Milne-Edwards, Hist. Nat. Crust. I. 345.

Mimulus, Stimpson, Ann. Lyc. Nat. Hist., New York, Vol. VII. 1860, p. 199.

Peltinia, Dana, U. S. Expl. Exp. Crust. I. p. 129.

* *Menæthius*.

Mocosa, Stimpson, Bull. Mus. Comp. Zool. II. 1870-71, p. 128.

* *Pugettia*.

? * *Scyramathia*.

* *Simocarcinus*.

* *Sphenocarcinus*, (? = *Oxypleurodon*, Meirs, 'Challenger' Brachyura, p. 38.)

Trigonothir, Miers, Ann. Mag. Nat. Hist. 1879, Vol. IV. p. 4.

* *Xenocarcinus*.

Sub-family III. *Pisinæ*.

ALLIANCE I. PISOIDA.

Arctopisis, Lamk. see *Pisa* emend. Miers, *infra*.

Acanthophrys, A. Milne-Edwards (as limited by Miers, J. L. S. Zool. XIV. 656), Ann. Soc. Entom. Fr. (4) V. 1865, p. 141, pl. v. fig. 3.

* *Anamathia*, Roux ; Milne-Edwards, Hist. Nat. Crust. I. 285.

Chionæcetes, Kroyer ; Miers, Journ. Linn. Soc. Zool. XIV. 1879, p. 654 (Syn. *Peloplastus*, see Miers, J. L. S., Zool. XIV. 654).

* *Chorilibinia*.

Chorinus, Leach ; Milne-Edwards, Hist. Nat. Crust. I. 314.

* *Doclea*.

* *Egeria*.

? *Esopus*, A. Milne-Edwards, Miss. Sci. Mex. Crust. I. p. 89.

* *Eurynome*, Leach ; Milne-Edwards, Hist. Nat. Crust. I. 350.

Hoplopisa, A. Milne-Edwards, Bull. Soc. Philom. (7) II. 1877-78, p. 222 ; and Miss. Sci. Mex. Crust. I. p. 201.

* *Hyas*, Leach ; Milne-Edwards, Hist. Nat. Crust. I. 311.

* *Hyastenus* (Syn. *Lahainia* and *Chorilia*.)

Lepteces, Mary J. Rathbun, P. U. S. N. M., Vol. XVI. 1893, p. 83.

Libidoclea, Edw. and Lucas, Voy. Amer. Merid. Crust., p. 6.

* *Libinia*, Leach ; Milne-Edwards, Hist. Nat. Crust. I. 298.

Lepidonaxia, Zool. Record, 1877, Crust., p. 11.

Loxorhynchus, Stimpson, Journ. Bost. Soc. Nat. Hist., Vol. VI. 1857, p. 451.

* *Naxia* (Syn. *Naxioides* and *Podopisa*).

? *Nibilia*, A. Milne-Edwards, Miss. Sci. Mex. Crust. I. p. 132.

Notolopas, Stimpson, Ann. Lyc. Nat. Hist. New York, X. 1874, p. 96.

Pelia Bell, Trans Zool. Soc. II. 1841, p. 44.

* *Pisa*, Leach, Miers ; Miers, 'Challenger' Brachyura, p. 53.

? *Pisoides*, Edw. and Lucas, Voy. Amer. Merid. Crust., p. 10.

Prionorhynchus, Jacquinot and Lucas, Voy. Pôle Sud, l' Astrolabe et la Zélée, tom. III. Crust., p. 5.

? *Pyria*, Dana, U. S. Expl. Exp. Crust. I. p. 96.

Rachinia, A. Milne-Edwards, Miss. Sci. Mex., pl. xviii., fig. 1 (if this genus is distinct from *Scyramathia*).

Salacia, Edw. and Lucas, Voy. Amer. Merid. Crust., p. 12.

Scyra, Dana, U. S. Expl. Exp. Crust. I. p. 95.

? * *Scyramathia* (Syn. ? *Rachinia*).

Trachymaia, A. Milne-Edwards, Bull. Mus. Comp. Zool. VIII. 1880-81, p. 3 ; and Miss. Sci. Mex. Crust. I. p. 351.

ALLIANCE II. LISSOIDA.

? *Coelocerus*, A. Milne-Edwards, Miss. Sci. Mex. Crust. I. p. 84.

Herbstia, Milne-Edwards, Hist. Nat. Crust. I. 301 (Syn. *Rhodia*, Bell, T. Z. S. II. 1841, p. 43; *Micropisa*, Stimpson, Proc. Ac. Nat. Sci. Philad., 1857, p. 217; *Herbstiella*, Stimpson, Ann. Lyc. Nat. Hist. New York, X. 1874, p. 93).

* Hoplophrys.

Lissa, Leach; Milne-Edwards, Hist. Nat. Crust. I. 310.

Parathoe, Miers, Ann. Mag. Nat. Hist., 1879, Vol. IV. p. 16.

Perinea, Dana, U. S. Expl. Exp. Crust. I. p. 114.

* Tylocarcinus.

Sub-family IV. *Mainæ*.

ALLIANCE I. MAIOIDA.

* Cyclax (*Cyclomaia*).

* Maia.

Maiella, Ortmann, Zool. Jahrb. Syst. &c., VII. 1893-94, p. 51.

Maiopsis, Faxon, Bull. Mus. Comp. Zool., XXIV. 1893, p. 150.

Nemausa, A. Milne-Edwards, Miss. Sci. Mex. Crust. I. p. 80.

* Paramithrax (* *Leptomithrax*, * *Chlorinoides*).

? *Phycodes*, A. Milne-Edwards, Rev. et Mag. Zool. (2) XXI. 1869, p. 374.

? *Pleurophricus*, A. Milne-Edwards, Journ. Mus. Godeffr., I. Crust. p. 260.

* Schizophrys (*Dione*).

Temnonotus, A. Milne-Edwards, Miss. Sic. Mex. Crust. I. p. 82.

ALLIANCE II. STENOCIONOPOIDA.

* Criocarcinus.

? *Eucinetops*, Stimpson, Ann. Lyc. Nat. Hist. New York, VII. 1862, p. 191.

* *Paramicippa*, Edw. Milne-Edwards, Hist. Nat. Crust. I. 332.

Picrocerus, A. Milne-Edwards, Ann. Soc. Ent. Fr. (4) V. 1865, p. 136.

Pseudomicippa, Heller, Crust. Roth. Meer., SB. Ak. Wien, XLIII. 1861, p. 301; and Miers 'Challenger' Brachyura, p. 68 (*nec syn.* *Microhalimus*).

Stenocionops.

Stilbognathus, E. Martens, Verh. zool.-bot. Ges. Wien, XVI. 1866, p. 379.

Tyche, Bell, P. Z. S. 1835, p. 172, and T. Z. S. II. 1841, p. 58 (*syn.* *Platyrinchus*, Desbonne and Schramm, Crust. Guadeloupe, p. 3).

ALLIANCE III. PERICEROIDA.

? *Ala*, Lockington, Proc. Calif. Acad. Sci. VII. 1876, p. 65.

Anaptychus, Stimpson, Ann. Lyc. Nat. Hist. New York, VII. 1862, p. 183.

? *Coelocerus*, A. Milne-Edwards, Miss. Sci. Mex. Crust. I. p. 84.

Cyclocoeloma, Miers, Ann. Mag. Nat. Hist. 1880, Vol. V. p. 228.

* *Cyphocarcinus*.

Hemus, A. Milne-Edwards, Miss. Sci. Mex. Crust. I. p. 88.

Leptopisa, Stimpson, Bull. Mus. Comp. Zool. II. 1870-71, p. 114.

* *Macrocoeloma* (*Entomonyx*: both these genera of Miers seem to me to be synonymous with *Micippoides* of A. Milne-Edwards.)

* *Micippa*.

Micippoides, A. Milne-Edwards, Journ. Mus. Godeffr. I. Crust. 254 (probably *Macrocoeloma* and *Entomonyx* may be here included).

* *Microphrys*, Edw.; Milne-Edwards, Ann. Sci. Nat. Zool. (3) XVI. 1851, p. 251; and Miers, 'Challenger' Brachyura, p. 82 (*syn. Milnia*, Stimpson, Ann. Lyc. Nat. Hist. New York, VII. 1862, p. 179: *Omala-cantha*, Hale Streets, Proc. Ac. Nat. Sci. Philad. 1871, p. 238; and A. Milne-Edwards, Miss. Sci. Mex. Crust. I. p. 64: *Fisheria*, Lockington, Proc. Calif. Ac. Sci, VII. 1876, p. 72.

Mithrax, Leach; Milne-Edwards, Hist. Nat. Crust. I. 317; and Miers, 'Challenger' Brachyura, p. 84 (*syn. Mithraculus*, White, *vide* Miers. J. L. S., Zool. XIV. 1879, p. 667: *Teleophrys*, Stimpson, Amer. Journ. Sci and Arts. (2) XXIX. 1860, p. 133.)

Othonia, Bell (*Pitho*, Bell, P. Z. S. 1835, p. 172: *Othonia*, Bell T. Z. S. II. 55): and A. Milne-Edwards, Miss. Sci. Mex. Crust. I. p. 114.

Pericera, Latr., Edw.; Milne-Edwards, Hist. Nat. Crust. I. 334; and Miers, 'Challenger' Brachyura, p. 76.

Picroceroides, Miers, 'Challenger' Brachyura, p. 77.

(This genus, though placed in this alliance on account of the structure of the orbits and basal antennal joint, is in many respects more closely allied to the *Stenocionopoida*).

Sisypheus, Desbonne Schramm, Crust. Guadeloupe, p. 20.

? *Thoe*, Bell, P. Z. S., 1835, p. 171: A. Milne-Edwards, Miss. Sci. Mex. Crust. I. p. 120 (*syn., sec.* Miers J. L. S. Zool. XIV. 667; *Platypes*, Lockington, Proc. Calif. Ac. Sci. VII. 1876, p. 41).

* *Tiarinia*.

The genus *Podohuenia*, placed among the *Periceridæ* in the Zoological Record for 1892 (Crust., p. 17), is inaccessible to me. The reference in the Zoological Record is to Boll. Soc. Nat. Napoli, III. 1889, p. 180.

Sub-family INACHINÆ (see Table I.).

Alliance I. LEPTOPODIOIDA (see Table I.).

LAMBRACHÆUS, n. gen.

Closely allied to *Leptopodia* and *Metoporaphis*, from which it differs (1) in its extremely long sub-cylindrical neck, (2) in its minute antennæ and (3) in the *Lambrus*-like proportions of its chelipeds.

Eyes antennules and antennæ borne at the end of a long narrow subcylindrical "neck," which is continued onwards as an extremely long slender spiny rostrum.

Eyes stoutish, salient and non-retractile: no defined orbits: a small postocular spine. Antennæ minute, exposed to dorsal view. Chelipeds stout and extremely long, with long sub-cylindrical palms and short fingers.

Legs very slender: shorter than the chelipeds.

Lambrachæus ramifer, n. sp., Plate III. fig. 1.

The body is formed by (1) a small trunk, (2) a long narrow almost cylindrical prestomial "neck," and (3) a long slender sinuous spiny rostrum shaped like a withered branch.

The carapace proper is trilobed, the lateral lobes being formed by the branchial regions, and the front lobe being formed by the wings of the buccal frame.

The "neck," at the end of which are borne the eyes, antennules, and antennæ, is rather longer than the carapace proper.

The rostrum is nearly twice the combined length of the neck and carapace.

The eyes are salient and non-retractile, and though there is a narrow dorsal eave round the base of the eyestalks and a pair of tiny postocular spines, there is nothing like an orbit present. The cornea is surmounted by a little tooth.

The antennæ are minute and filiform, and are completely exposed: their total length is not one-sixth that of the rostrum.

The antennules are of large proportions: they fold longitudinally, but when folded are much beyond the capacity of the narrow shallow antennular fossæ.

The external maxillipeds have broad endopodites, and completely cover the buccal frame: the merus is expanded in both directions, but most at its internal angle, so that the flagellum is inserted nearer to the external angle.

Table I. Sub-family INACHINÆ.

Eyes without orbits; the eye-stalks usually long and slender, and either non-retractile, or retractile against the carapace or against an acute post-ocular spine or spine that affords no concealment. The basal joint of the antennæ is extremely slender throughout, and is usually long. Legs slender. Rostrum either simple, or two-spined, or emarginate in *Platymaia* apparently trifold).

Key to the Indian Genera.

Alliance 1. LEPTOPODIOIDA. Antennæ with the basal joint usually sub-cylindrical, or at any rate usually convex on the ventral surface, and independent. External maxillipeds with the merus narrower than the ischium, and often with a large coarse palp, and therefore somewhat pediform in shape.

1. Carapace of the typical Oxyrhynch shape, elongate-triangular or pyriform.	1. Carapace well-calcified, not depressed: rostrum separated from the carapace by a distinct post-ocular constriction, which sometimes forms a long "neck."	i. Chelipeds both markedly longer and vastly stouter than the longest legs: rostrum simple and much longer than the carapace: post-ocular "neck" at least as long as the carapace.....	a. Free joints of the antennal peduncle slender, cylindrical and not coarsely hirsute: eye-stalks almost straight: rostrum horizontal.	a. ¹ Eye-stalks salient, but freely moveable forwards and sometimes backwards: basal antennal joint not reaching to the apex of the rostrum.	a. ² Basal antennal joint long: epistome spacious.	a. ³ Body and appendages very spiny: some post-ocular spinules: eye-stalks retractile backwards, but never concealed.	a. ⁴ Rostrum formed of two long spines; none of the legs subchelate.....	LAMBRACHÆUS.
						b. ⁴ Rostrum short, bifid: last pair of legs subchelate.....	ECHINOPLEX.	
						b. ³ Body and appendages smooth or with very few spines: no post-ocular spine: the eye-stalks hardly moveable backwards.....	GRYPACHÆUS.	
							ACHÆUS.	
						b. ² Basal antennal joint very short, not reaching to the front: epistome very narrow.....	PARATYMOLUS.	
						b. ¹ Eye-stalks salient and rigidly immoveable: basal antennal joint projecting beyond and above the apex of the rostrum.....	PHYSACHÆUS.	
						b. Free joints of the antennal peduncle short, flat, and densely hairy: eye-stalks much curved: rostrum somewhat depressed: a post-ocular tooth.....	CAMPOSCIA.	
							ONCINOPUS.	
						2. Carapace semi-membranous, exceedingly depressed and flat: rostrum in unbroken continuity with the carapace: no post-ocular spine: the last pair of legs subdorsal in position.....		
						II. Carapace nearly circular. [Epistome narrow: a large post-ocular spine against which the eye is retractile, but which affords no concealment: basal antennal joint perfectly free, legs long, with much flattened blade-like joints: rostrum trifid.].....		
1. Rostrum simple: post-ocular spine small: basal antennal spine small or moderate.								
1. Branchial regions upraised, and meeting across, and thus concealing, the cardiac region: 2nd pair of trunk-legs, in the adult, many times the length of the carapace.....								
2. Cardiac region not encroached upon by the normal branchial regions: 2nd pair of trunk-legs of moderate length.....								
II. Rostrum bifid: post-ocular spine large: basal antennal spine large.....								
1. Eyes hardly retractile.....								
2. Eyes retractile against a strong post-ocular spine.....								

Alliance 2. INACHOIDA. Antennæ with the basal joint flattened or concave on the ventral surface, and intimately fused with the surrounding parts, its antero-external angle produced to form a spine which is visible from above on either side of the rostrum. External maxillipeds with the merus as broad as or broader than the ischium, and with the palp small.

The chelipeds, though actually slender, are relatively to the carapace as stout and long as those of the longer-armed species of *Lambrus*: they are one-third longer than the combined carapace neck and rostrum: they are sub-cylindrical and spiny: their proportions are much those of *Lambrus*, the fingers being not much more than a quarter the length of the palm. The fingers are curved, and are in contact only at their tips.

The legs, which are very slender and are not quite so long as the chelipeds, display no remarkable characters.

The figure, which represents a male magnified two diameters, shows the proportions better than any table of measurements.

Loc. Port Blair, Andaman Islands.

ACHÆUS, Leach.

Achæus, Leach, Malac. Podophth. Brit., Tab. XXII. fig. C.

Achæus, Desmarest, Consid. Gen. Crust., p. 153.

Achæus, Milne-Edwards, Hist. Nat. Crust. I. 281.

Achæus, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 643; and 'Challenger' Brachyura, p. 8.

Carapace triangular with the branchial regions swollen, always more or less constricted behind the eyes. Rostrum very short, bifid. Eye-stalks long and hardly retractile backwards: no orbits or post-ocular spine. Antennæ with the basal joint very slender, sub-cylindrical, the other joints and the flagellum completely exposed. External maxillipeds with the meropodite long, narrower than the ischiopodite, and carrying the next joint at, or near, its apex. Chelipeds short, not very stout. Legs slender, sometimes long and filiform: the dactyli of those of the last two pairs more or less falcate. Abdomen consisting of six segments in both sexes.

As Miers has remarked, this genus is distinguished from *Stenorhynchus* only by the form of the rostrum, which consists of two short lobes instead of two long spines.

Key to the Indian species of the genus Achæus.

- I. Carapace with a post-ocular constriction, but with no long post-ocular "neck:" dactyli of last pair, or two pair, of legs strongly falciform:—
 1. Carapace and eye-stalks smooth ... *A. lacertosus*.
 2. Carapace with a bilobed prominence on the cardiac region: eye-stalks with a tubercle on the anterior surface:—
 - i. Gastric region smooth ... *A. affinis*.

- ii. Gastric region with a sharp tubercle or spine *A. spinosus.*
- II. Carapace with a long post-ocular neck: dactyli of last pair of legs hardly curved:—
 - 1. Lobes of rostrum with a spinate carina: median tubercles of carapace low and blunt ... *A. cadelli.*
 - 2. Lobes of rostrum with a smooth carina: median tubercles of carapace sharp and elevated *A. tenuicollis.*

Achæus tenuicollis, Miers.

Achæus tenuicollis, Miers 'Challenger' Brachyura, p. 9, Pl. I. fig. 3.

"The body is thinly clothed with short curled hairs; the limbs with similar hairs, interspersed among which are some longer ones. The carapace is subtriangulate, little longer than broad, with a neck-like constriction behind the orbits, and armed with spines as follows:—Three conical spines upon the gastric and another upon the cardiac region, two shorter conical spines or tubercles whereof the anterior is the smallest, on each branchial region, behind these one very small on the posterior margin of the carapace, and another on the sides of the branchial regions above the bases of the chelipedes; also a small spine upon the rounded, lateral, hepatic protuberance, and another behind this, on the pterygostomian region; there is also a strong spinule on the upper margin of the orbit, above the eye-peduncles. The lobes of the rostrum are short, and terminate each in a spine. The sternal surface of the body bears a few spinules. The post-abdomen of the male, is as usual, six-jointed (the two last joints having coalesced). The eye-peduncles are robust, with the corneæ protuberant; a small spinule exists on the inferior margin of the eye-peduncle, and another on the upper margin of the eye, near the distal extremity. The antennules are lodged in deep longitudinal fossettes; the very slender basal joint of the antennæ is joined with the front at its distal extremity and bears several small spinules on its inferior surface, the following joint is short, the next about as long as the basal joint, flagella slender; the ischium-joint of the outer maxillipedes is produced at its inner and distal angle which is rounded and bears several spinules on its outer surface, as does also the merus-joint which is rounded, not truncated, at the distal extremity where it bears the next joint. The chelipedes (in the male) are rather slender, and longer than the body; with the joints clothed with rather long hairs; ischium and merus-joints with a series of spinules on their antero- and postero-inferior faces, wrist about as long as palm, with a few spinules hardly discernible amid the hairs which clothe this joint,

palm slightly compressed, not dilated, armed with spinules on its upper and lower margins, fingers about as long as palm, and slightly incurved at the apices which are nearly destitute of hair; the ambulatory legs are very slender and elongated; the dactyli of the first three pairs are short and nearly straight, in the last pair only are they slightly falciform. Colour (in spirit) light yellowish-brown." (Miers).

A single specimen is included in the Museum collection: the locality is not quite certain, but it came most probably from the Andamans.

Achæus cadelli, n. sp. Plate V. fig. 1.

In general form and proportions much resembling *Achæus lorina* (Ad. & White), from which it differs in having the legs even more slender, and the eye-stalks quite smooth.

The regions of the pyriform carapace are well demarcated, the hepatic regions being each produced to form a strong sharp tooth. There are three elevations, arranged in triangle, on the gastric region, and two, side by side, on the cardiac region.

The rostrum has the usual *Achæus*-form, but each lobe is dorsally carinate, the carina being spinate or serrate.

Behind the rostrum is a long constricted "neck," more pronounced even than that of *A. tenuicollis* and *brevirostris*.

The chelipeds are of the usual form. The legs are extremely long and slender, those of the second trunk segment being about five times the length of the carapace, rostrum included. The dactyli of the 4th and 5th pairs are hardly falciform. Length of carapace, 7 millim: greatest breadth of carapace, 4 millim.: length of 2nd pair of trunk-legs, 36.5 millim.

Loc. Andamans.

Achæus spinosus, Miers.

Achæus spinosus, Miers, Japanese and Corean Crustacea, in Proc. Zool. Soc., 1879, p. 25.

Carapace triangular, narrowed behind the eyes, and armed with six spines above, namely: one on the gastric, one—bilobed—on the cardiac, and two on each branchial region: there are also some spines or sharp tubercles on the ventrad aspect of the hepatic and branchial regions. The rostrum is small and bilobed. The eye-stalks are robust, and have a strong tubercle near the middle of the anterior surface. Chelipeds in the male robust, the arm and wrist granular above, the palm swollen, with about six spinules on the upper margin and a few granules on the lower margin near its base: fingers, in the male, acute

with a wide hiatus at base when closed, both with a strong tooth on their opposed margins near the base, and with the outer margins carinate. In the female the chelipeds differ only in being much less robust, and in having the fingers much more closely apposable and toothless. Ambulatory legs long and slender: the dactylus of the last pair strongly falcate.

[The basal antennal joint has one or two spines at its distal end, and the free portion of the antenna is much shorter than the carapace.]

Length of adult, 6 to 7 millim.

In the Museum collection, from the Persian Gulf. Ex coll. W. T. Blanford.

Achæus lacertosus, Stimpson.

Achæus lacertosus, Stimpson, Proc. Acad. Nat. Sci. Philad., 1857, p. 218.

Achæus breviceps, Haswell, Proc. Linn. Soc., N. S. Wales, Vol. IV. 1879, p. 433 (sec. Haswell).

Achæus lacertosus and *breviceps*, Haswell, Cat. Austr. Stalk and Sess. eyed Crust., p. 3.

Achæus lacertosus Miers, Zool. "Alert," pp. 181 and 188; and "Challenger" Brachyura, p. 8.

Achæus lacertosus, J. R. Henderson, Trans Linn. Soc., Zool., 1893, p. 341.

Carapace triangular, with the regions fairly well delimited and the surface quite smooth beneath a slight pubescence: hepatic region with a horizontal laminar tooth. Rostrum as long as wide, bilobed. Antennæ filiform, the free portion longer than the carapace. Eye-stalks long, slender, smooth. Chelipeds much stouter than the other legs, the meropodite being the stoutest joint, and the hand being incurved and the fingers compressed. The ambulatory legs are long and slender, the first pair being more than three times the length of the carapace: the dactyli of the last two pairs are strongly falcate.

Length of adult about 6 millim.

In the Museum collection are numerous specimens from the Andamans, from Palk Straits, and from the Orissa Coast.

Achæus affinis, Miers.

Achæus affinis, Miers, Zoology of the 'Alert,' pp. 181 and 188, and "Challenger" Brachyura, p. 8.

Achæus affinis, de Man, Archiv. f. Naturges., LIII. 1887, p. 218.

Achæus affinis, Henderson, Trans. Linn. Soc., Zool. (2) V. 1893, p. 341.

Achæus affinis, Ortmann, Zool. Forsch. in Austr. and Malay Arch., Jena, 1894, p. 37.

"Carapace subtriangular and moderately convex, with the surface uneven, but the regions not very distinctly defined; the post-orbital

region is constricted. The rostrum is moderately prominent, the frontal lobes very small and subacute. On the cardiac region is a bilobated prominence, which is usually very much elevated; there is a small angulated prominence on the hepatic regions, and occasionally one or two granules on the branchial regions, which are not at all convex. Eye-peduncles with a blunt tubercle in the middle of their anterior margins. The merus-joints of the outer maxillipedes are narrowed and subacute at their distal ends, where they are articulated with the next joints. The chelipedes (in both sexes) are rather slender; margins of the arm, wrist, and palm usually with a few granules or spinules; merus somewhat trigonous; fingers as long as the palm, and somewhat incurved, with their inner margins denticulated, and having between them when closed (in the males) a small hiatus at base. The ambulatory legs are slender, filiform, and very much elongated, the second legs being, in an adult male, four times as long as the postfrontal portion of the carapace; the dactyli of the two posterior pairs only are distinctly falciform; both chelipedes and ambulatory legs are scantily clothed with long hairs. Length of carapace (including rostrum) of an adult male about 5 lines (10·5 millim.), breadth about 3 lines (6 millim.); length of second leg about 1 inch 8 lines (42 millim.); an adult female has the carapace relatively somewhat broader, length nearly $5\frac{1}{2}$ lines (12 millim.), breadth 4 lines (8·5 millim.).

The bilobated prominence on the cardiac region and tuberculated eye-peduncles serve to distinguish this species." (Miers).

This species is included in the Indian Fauna on the authority of Professor Henderson: there are no specimens in the Indian Museum collection.

PARATYMOLUS, Miers.

Paratymolus, Miers, P. Z. S., 1879, p. 45.

Paratymolus, Haswell, Ann. Mag. Nat. Hist., 1880, Vol. V. p. 302; and Cat. Austr. Crust., p. 142.

Paratymolus, Ortmann, Zool. Jahrb. Syst., &c., VII. 1893-94, p. 34.

I agree with Ortmann in placing this genus among the *Achæus*-like *Maiidæ*: the position of the external genitalia of an ovigerous female in the Museum collection is conclusive.

Carapace elongate-subpentagonal, not depressed.

Eye-stalks long, slender, salient, non-retractile: no orbits or pre-ocular and post-ocular spines. Antennules longitudinally folded beneath the rostrum.

Antennæ long, exposed, dorsally, in the greater part of their extent: the basal joint slender, but so short as hardly to reach the front.

Rostrum short, emarginate, distinctly delimited from the carapace. Epistome short.

External maxillipeds with the merus narrower than the ischium, and bearing the flagellum at the antero-internal angle.

Legs not elongate: dactyli slender, straight.

Paratymolus hastatus, n. sp. Plate V. figs. 4, 4a.

Carapace somewhat elongate-pentagonal or ovoid, with the rostrum sharply demarcated, and with the regions undefined.

Gastric region with three sharp tubercles disposed in a triangle, base forwards: cardiac region with a single tubercle: branchial regions each surmounted by an oblique crest of 2 or 3, and with a lateral marginal row of 2 or 3, sharp tubercles: hepatic regions each with two sharp lateral teeth, the posterior of which is large. Rostrum short, emarginate, deeply and broadly grooved dorsally.

Eye-stalks long, laterally projecting, slightly moveable forwards but not retractile. Eyes tipped with two or three stiff setæ. No orbits, and nothing in the shape of orbital spines except a slight angular emargination of the base of the rostrum.

Antennæ as long as the post-orbital portion of the carapace, and visible, dorsally, from the base of the second joint of the peduncle: the basal joint, which alone is concealed, although slender is short, hardly reaching the front.

External maxillipeds with the merus broad, but not so broad as the ischium, and giving insertion to the palp at the antero-internal angle.

Trunk-legs with a few coarse stiff setæ: the 2nd pair, which are slightly the longest, are a little less than twice the length of the carapace without the rostrum.

Chelipeds characterized by the carpus, which has its antero-internal angle produced obliquely to form a great spike, the point of which reaches almost to the base of the fingers.

Length of carapace 6 millim. Breadth of carapace 4·5 millim. Length of 2nd pair of legs 10·5 millim.

An egg-laden female from the Andamans; in which I am satisfied that the genital orifices are not on the bases of the third pair of legs, but on the sternum.

PHYSACHÆUS, n. gen.

Closely allied to *Achæus*, from which it is distinguished chiefly by the form of the basal joint of the antennary peduncle, which is long and slender, and is fused near its distal end with the tip of the rostrum.

General form that of an *Achæus* with the pterygostomian and branchial regions so inflated as to push forwards the epistomial region to a plane almost at right angles with the antennary region.

Eyes small, slender, rigidly immovable,—in short undergoing degeneration. No orbits or orbital spines.

Rostrum very short, bifid, at tip, the point of each tooth being fused with the distal end of the (otherwise free) sub-cylindrical basal joint of the antennary peduncle. Antennæ of great length.

External maxillipeds with the merus rounded and slightly produced beyond the articulation—at the antero-internal angle—of the palp: the merus much narrower than the ischium. Legs long and slender, with long filamentous dactyli. Chelipeds short.

Physachæus ctenurus, n. sp. Plate III. figs. 2, 2 a-b.

Carapace sub-triangular, globosely inflated, with all the regions, except the cardiac, tumid and fairly well delimited, and with a strong post-ocular constriction, beneath which there is an almost vertical descent to the mouth.

The rostrum, which is small, consists of two narrow, slightly divergent, hollow teeth, to either apex of which the distal end of the otherwise perfectly free basal joint of the corresponding antennary peduncle is fused.

Two large erect procurved spines occur in the middle line of the carapace; one on the posterior part of the gastric region, the other behind the cardiac region: on either side of the former, but in a plane anterior to it, there may sometimes be a spinule.

In both sexes the abdomen is bluntly but strongly carinated down the middle line, the carina in the case of the male ending on the 6th tergum in a huge recurved spine: in the female instead of a spine there is a small tubercle, and the posterior edge of the sixth tergum bears a row of four spines.

The eye-stalks are very small, and are rigidly fixed at right angles to the rostrum: the corneæ are almost devoid of pigment. There are no orbits or orbital spines.

The antennæ are distinctly exposed from their base, and are half as long again as the entire carapace, between one-third and two-fifths of their extent being formed by the slender peduncle. The basal joint is slender and almost cylindrical: it is quite free from neighbouring parts, except at the distal end, which is fused with the tip of the rostrum. The flagella are fringed with long hairs.

The antennules are large, and fold longitudinally within the hollow teeth of the rostrum. Except in regard of the fingers, the chelipeds

have much the same form as, though slenderer proportions than, those of *Stenorhynchus*, but the merus is much more strongly and elegantly curved: the merus and carpus are moderately inflated, the former joint, like the ischium, having its lower edge more or less granulate: the palm is compressed, with the edges denticulate: the fingers are strongly compressed, and have the cutting edges accurately and completely apposable throughout, being denticulate near the tips only.

In the female the chelipeds have the same general form as in the male, but differ in having the lower edge of the ischium and merus strongly spinate. The legs are slender and filiform, about one-fourth of their length being contributed by the filamentous dactylus: those of the third trunk-segment are the longest, being about four times the length of the carapace, rostrum included, and more than two-and-a-half times the length of the chelipeds.

		Male.		Female.
Length of carapace	...	7.2 millim.	...	8.5 millim.
Breadth of carapace	...	6.0	„	7.0
Length of legs of 2nd trunk-segment		28.0	„	28.0
„ „ 3rd „ „		32.0	„	32.0

Numerous males and egg-laden females from the Andaman Sea, 240 to 375 fathoms.

The eggs are few in number and are singularly large, those from a female of the dimensions given above being over a millimetre in diameter.

Physachæus tonsor, n. sp. Plate III. fig. 3.

The female, which is the only sex represented in the collection, differs from the female of *Physachæus ctenurus* in the following particulars:—

(1) the gastric region of the carapace, instead of a single large spine, has several smooth tubercles; and the large spine behind the cardiac region is coarser, and is recurved instead of procurved: the post-ocular constriction is less marked:

(2) the abdominal carina ends in a spine, and the sixth tergum has its after edge perfectly smooth instead of quadrispinate:

(3) the eye-stalks are larger, and are compressed instead of cylindrical:

(4) the chelipeds are relatively stouter, being of much the same proportions as those of the male of *Physachæus ctenurus*: their merus is compressed and has its lower border very strongly and sharply carinated: the hands are much thinner and more compressed; the palm

having its lower edge, and the fingers their outside edges, sharply cristate:

(5) the legs of the second, not of the third, trunk-segment are the longest, and considerably so.

Length of carapace 11 millim. Breadth of carapace 9·5 millim. Length of legs of 2nd trunk-segment 47 millim., of 3rd trunk-segment 40 millim.

Two egg-laden females from the Andaman Sea, 271 fathoms.

The eggs, as in the preceding species, are large and few in number.

The above species represent an *Achæus* modified for life at a considerable depth. The branchial chambers, as is very commonly the case in deep-sea Malacostraca, are greatly inflated: the eyes have degenerated, and the antennæ—no doubt in compensation—have become remarkably lengthened: while the auditory tubercles also, it may be mentioned, are large and prominent.

GRYPACHÆUS, n. gen.

Intermediate between *Achæus* and *Echinoplax*.

Carapace triangular, spiny, separated from the frontal region by a post-ocular “neck.” Rostrum spiny: composed of two short divergent spinelets, with a strong median deflexed (interantennulary) spine, not visible from above. Eyes laterally projecting, movable, but not sufficiently retractile to be ever concealed. Small supra-ocular and post-ocular spines are present as part of the general spinature. Antennæ dorsally exposed from the basal joint of the peduncle, which joint is long slender cylindrical and spiny. External maxillipeds with the merus elongate, much narrower than the ischium, and not much broader than the carpopodite. Legs hairy and spiniferous. Abdomen six-jointed in ♀.

Grypachæus hyalinus (Alcock & Anderson). Plate III. figs. 4, 4a.

Achæus hyalinus, Alcock & Anderson, J. A. S. B., Pt. ii. 1894, p. 205.

Carapace sub-triangular, thin, vitreous, spiny especially in its anterior half: the regions well delimited, and the post-ocular portion constricted to form a “neck.” The rostrum, as seen from above, ends in two short spines, each of which has a spine at its base; but from in front or from below it shows a strong vertically deflexed (interantennulary) spine.

The eyes are large; and the long eye-stalks, which bear two tubercles on their front surface, are movable backwards, and are exposed from

their base in all positions. The antennæ are visible, dorsally, from the end of the basal joint of the peduncle, which joint is long, slender, cylindrical and spiny.

The external maxillipeds are large, hairy, and almost pediform, owing to the narrowness of the merus and the coarseness of the palp.

The trunk-legs are hairy and spiny, the hairs on the 2nd and 3rd pairs being remarkably long, stiff, and closely and evenly set. The arm, wrist, and hand of the chelipeds—but especially the arm—are acutely spiny, as are also the edges of the meropodites of the legs,—the spinature of the front edge of the meropodites of the 2nd and 3rd pairs being particularly prominent. The fifth pair of legs are sub-chelate, the propodite having its proximal end strongly dilated to receive the folded-back dactylus: the apposed edge of the dactylus is minutely, that of the propodite sharply and conspicuously, spinate.

Length of carapace 14 millim. Breadth of carapace 9 millim.
Greatest span (between extended 2nd pair of trunk-legs) 67 millim.

Loc. Off Trincomalee 28 fms. Females only.

ECHINOPLAX, Miers.

Echinoplax, Miers, "Challenger" Brachyura, p. 31.

Carapace sub-pyriform, longer than broad, and covered with very numerous closely-set spines and spinules : orbital margin spinose : spines of rostrum acute, divergent from their bases, and bearing several accessory spinules. Post-abdomen seven-jointed. Basal antennal joint slender, spinuliferous, and in contact with the front at the distal extremity : flagellum visible from above at the sides of the rostrum. Maxillipeds with the merus narrower than the ischium, and the palp coarse ; merus truncated and not notched at the distal extremity, the antero-lateral angle not produced. Legs spinuliferous. Chelipeds in the female [as in the male] slender and feeble, with the palms not dilated. Ambulatory legs considerably elongated, with the penultimate joint not dilated ; the dactyli nearly straight.

Key to the Indian Species of Echinoplax.

Carapace with the regions well defined: rostrum in the adult considerably less than half the length of the carapace:—

1. Carapace and abdominal terga closely covered with pungent acicular spines of equal size...*E. pungens*.
2. Carapace and abdominal terga finely granular, with a few definitely placed spines of conspicuous size *E. rubida*.

Echinoplax pungens, Wood-Mason.

Echinoplax pungens, Wood-Mason, Ann. Mag. Nat. Hist., March, 1891, p. 259.

Carapace pyriform, convex, with the regions well delimited; densely covered, as are also the sterna, chelipeds, ambulatory legs, and external maxillipeds, with pungent acicular spines. The abdominal terga of the male and young female are also similarly spiny, but in the adult female they become only distantly and coarsely granular.

The rostrum consists of two slender curved divergent spines—less than one-third the length of the carapace proper—the outer and lower surfaces of which are extremely spiny.

The eye-stalks, which have the anterior surface closely spinulate, are retractile, but not to the extent of concealment: there is a strong post-ocular spine—to which, however, the retracted eye does not nearly reach—and numerous smaller spines along the supra-ocular and infra-ocular margins. The antennæ are visible from above, from the middle of the second joint of the peduncle: the peduncle is spiny, with all the joints very slender: the flagellum reaches a little beyond the tip of the rostrum.

The interantennular spine is large and deeply bifid.

The chelipeds, which are alike in form in both sexes—though relatively longer in the male—are not stouter than the ambulatory legs, and are rather longer than the carapace and rostrum.

The legs of the next pair are more than twice, and those of the third pair rather less than twice the length of the chelipeds, while the fourth and fifth pairs decrease considerably in length: the dactyli of all are densely covered with a brushwork of setæ.

		Male (adult).	Female (adult).
Length of carapace and rostrum	...	70 millim.	79 millim.
Greatest breadth of carapace	...	47 „	57 „
Length of cheliped	...	76 „	75 „
„ „ 2nd pair	...	158 „	191 „

Andaman Sea, 130–250 fathoms.

A figure of this fine species has been drawn for “Illustrations of the Zoology of the ‘Investigator’” for 1896.

Echinoplax rubida, n. sp.

Differs from *Echinoplax pungens*, specimens of the same sex, and of approximately the same size being compared, in the following particulars:—

1. The carapace, instead of being everywhere covered with pun-

gent acicular spines of uniform size, is finely granular, with certain definitely placed distant thornlike spines of conspicuous magnitude, namely :—four in triangle on the gastric region, two side by side on the cardiac region, two side by side on the intestinal region, three on each hepatic region, and three on each branchial region: besides these there are some smaller spines on the lateral aspect of the pterygostomian and branchial regions :

2. The rostral spines are less divergent, and have elegantly curved tips :

3. The abdominal terga (of the young female), instead of being everywhere closely covered with pungent spines, are merely finely and distantly granular, with a single large spine on the first tergum, and a pair of smaller spines on the second, in the middle line :

4. The legs are much less spiny, the propodites of the ambulatory legs being fringed with stiff bristles instead of spines :

5. The colour differs, being, in spirit specimens, a warm brown, instead of a pale yellow.

It differs from *Echinoplax moseleyi*, Miers, judging from the figures and description, in the following particulars :—

1. The regions of the carapace are well delimited by sharp cut grooves :

2. The rostral spines are considerably less than half the length of the carapace proper :

3. The armature is altogether different, the large stout spines of the present species standing out on a finely granular carapace, and the abdominal terga being distantly granular.

Total length of carapace 35 millim., breadth of carapace 21 millim., greatest span (2nd pair of trunk-legs) 150 millim.

Loc. Andaman Sea, 90 to 177 fathoms.

PLATYMAIA, Miers.

Platymaia, Miers, 'Challenger' Brachyura, p. 12.

Carapace sub-orbicular. Rostrum short, tridentate owing to the size and projection of the interantennular septum. No pre-ocular spine; but a post-ocular spine against which the eye is retractile, but which affords no concealment to the eye. Epistome extremely narrow. Eyes large, with short eye-stalks. Basal antennal joint short, cylindrical, and perfectly free: the flagellum and part of the peduncle visible from above.

External maxillipeds with the meropodite narrow, and bearing the next joint at its summit. Chelipeds in the male long, with a long in-

flated club-shaped palm: in the female very short and slender. Ambulatory legs long, with remarkably thin compressed joints: some of the legs spiny.

Abdomen in both sexes with all the segments separate.

This genus appears to be very closely related to *Macrocheira*.

Platymaia wyville-thomsoni, Miers.

Platymaia wyville-thomsoni, Miers, 'Challenger' Brachyura, p. 13, pl. ii. fig. 1.

Platymaia wyville-thomsoni, Wood-Mason and Alcock, Ann. Mag. Nat. Hist., March, 1891, p. 258, and May, 1894, p. 401.

Carapace transversely sub-circular with the cervical groove well defined: its surface ranging from spinate (in the young) to nearly smooth (in old adults). The rostrum, which is so short as not to break beyond the general outline, consists of three stout spines of equal size, the middle one being the horizontally projecting interantennular spine.

The hepatic region of the carapace bears (in the adult) a nearly vertically disposed row of three spines, against the upper one of which the eye is retractile.

The eye-stalks are short, and the eyes large and oval. The antennæ are about one-third the length of the carapace, and are plainly visible, in almost the whole of their extent, from above: the joints of the peduncle are short slender and cylindrical, the basal joint being perfectly free.

The external maxillipeds have the meropodite narrow (about half the breadth of the ischiopodite) and giving attachment to the coarse palp at the summit: both meropodite and ischiopodite are spiny.

The chelipeds vary considerably according to sex: in both sexes they are spiny up to the base of the fingers; but whereas in the female and young male they are much slenderer than any of the legs and are not longer than the carapace, in the adult male they are from two to three times the length of the carapace and are much stouter than any of the legs—especially as regards the palm, which is swollen and club-shaped. The 2nd to 5th pairs of legs are long and slender, with the joints thin and compressed, the propodites being blade-like. The 2nd pair, which are from $3\frac{3}{4}$ (female) to $5\frac{1}{2}$ (male) times the length of the carapace, are remarkable for their propodite and dactylus, the front edge of which bears a double comb of enormous spines, the posterior edge also being spinulate: both edges of the merus and carpus also are distantly spinulate. The 3rd and 4th pairs have the front edge of the merus distantly spinulate, and they, as well as the 5th pair, have the front edge of the razor-like merus closely fringed with long stiff hairs.

The abdomen in both sexes is seven-jointed, the abdominal terga, like the thoracic sterna, bearing a few spines or tubercles. The epimeral plates corresponding to the third and fourth trunk legs are also spinate.

Andaman Sea, 130–405 fathoms.

A large male of this fine species have been figured for “Illustrations of the Zoology of the ‘Investigator’” for 1896.

Note on some obvious growth-changes in *Platymaia wyville-thomsoni*.

In very young specimens (carapace less than half an inch in diameter) the whole carapace is closely and sharply spiny.

In larger specimens (carapace about three-quarters of an inch in diameter) the carapace has become closely and finely granular, with the spines persistent only in definite situations, somewhat as in Miers’ figure and description (*loc. cit.*)

In larger specimens (carapace two and a half inches in diameter) the carapace has become coarsely and bluntly granular, without any spines, except a few quite anteriorly in the neighbourhood of the hepatic region.

In the largest specimens (carapace three to nearly four inches in diameter) the carapace is in places quite smooth, the only spines present being two external to the eye, and one on the front margin of the hepatic region.

In contrast with the carapace, the spines on the abdominal sterna of the male show no signs of effacement with age.

The colours also vary with age. In young males the carapace is red, with or without white points, and the legs are red and white in alternate bands. In the adult the colour is uniform.

ONCINOPUS, de Haan.

Oncinopus, de Haan, *Fauna Japonica*, Crust., p. 87.

Oncinopus, Miers, *Journ. Linn. Soc., Zool.*, Vol. XIV. 1879, p. 645; and ‘Challenger’ *Brachyura*, p. 20.

“Carapace semi-membranaceous, elongate, narrow-triangulate and depressed. Rostrum very short, composed of two vertically compressed laminiform lobes: no præ- or post-ocular spines. Post-abdomen in both sexes distinctly seven-jointed. Eyes slender and projecting laterally. Antennæ with the basal joint very short and slender, and not attaining the front, the flagella exposed and visible at the sides of the rostrum. Merus of the exterior maxillipedes elongated, and articulated with the

next joint at its summit. Chelipedes in the male rather small, with the palm turgid, and the fingers having between them, when closed, an interspace at the base. Ambulatory legs slender and [somewhat elongated, with the penultimate joints of the first and second pairs dilated, compressed, and ciliated on the posterior margin; the dactyli in all slightly arcuated and retractile against the penultimate joints.”

Oncinopus aranea, de Haan.

Inachus (Oncinopus) aranea, de H., Faun. Japon. Crust., p. 100, pl. xxix. fig. 2.

Oncinopus aranea, Adams and White, Zool. ‘Samarang,’ Crust., p. 3.

Oncinopus neptunus, Adams and White, Zool. ‘Samarang,’ Crust., p. 1, pl. ii. fig. 1.

Oncinopus subpellucidus, Stimpson, Proc. Acad. Nat. Sci. Philad., 1857, p. 221.

Oncinopus angulatus, Haswell, Proc. Linn. Soc., N. S. Wales, IV. 1879, p. 433.

Oncinopus subpellucidus, Haswell, Cat. Austr. Crust., p. 5.

Oncinopus aranea, Miers, Zool. ‘Alert,’ pp. 182 and 190; and ‘Challenger’ Brachyura, p. 20.

Oncinopus neptunus, Walker, Journ. Linn. Soc., Zool., Vol. XX. 1890, p. 109.

Oncinopus aranea, Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 341.

Oncinopus aranea, Ortmann, Zool. Jahrb., Syst. etc., VII. 1893, p. 37.

Oncinopus neptunus, Alcock and Anderson, J. A. S. B., Pt. ii. 1894, p. 199.

Carapace elongate-triangular, thin and semi-membranous, and, as well as all the appendages, tomentose. Rostrum short, bilobed.

Eyes small, retractile beneath the edge of the carapace: no orbits or protective spines.

Antennæ extremely short, reaching only just beyond the tip of the rostrum: the basal joint short and free.

Chelipeds in the female and young male slenderer than the next legs and not quite equal in length to the carapace; in the adult male about as stout as the next legs, with an inflated almost globose palm, and a little longer than the carapace.

The 2nd and 3rd pair of legs differ very markedly from the 4th and 5th pair. The 2nd and 3rd pair are long and stout, with a comparatively short carpopodite, with a long broad propodite, and with a comparatively slightly curved dactylus—all these joints being remarkably setaceous. The 4th and 5th pair, on the other hand, are slender and comparatively short, with a long slender carpopodite and with a short propodite which with the strongly recurved dactylus forms a sub-chela—all these joints being merely tomentose. The 5th pair of legs is also remarkable for its sub-dorsal position.

Length of carapace of an adult, 14 to 15 millim.

Specimens in the Museum collection from the Laccadives, Maldives, Ceylon, Andamans and Malay Peninsula, up to 32 fms.

CAMPOSCIA, Latreille.

[*Camposcia*, Latreille, Cuvier Regne Animal (2) IV. p. 60.]

Camposcia, Milne-Edwards, Hist. Nat. Crust. I. 282.

Camposcia, de Haan, Fauna Japonica, Crust., p. 87.

Camposcia, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 644.

Carapace pyriform. Rostrum broad, exceedingly short—hardly surpassing the level of attachment of the eyes—emarginate, slightly deflexed.

Eye-stalks long, recurved, retractile towards the sides of the carapace: a post-ocular tooth, not however affording any concealment to the eye. Antennular fossæ coalescent to form a single chamber. Antennæ moderately long, almost entirely exposed to dorsal view, the free joints of the peduncle flattened.

External maxillipeds with the merus narrower than the ischium, and giving attachment to the next joint at the summit. Chelipeds in both sexes slender—but most so in the female—and short. Some of the ambulatory legs long.

The abdomen in both sexes has all seven joints distinct, and is as broad in the adult male as it is in the adult female—covering almost the whole sternum.

Camposcia retusa, Latr.

[*Camposcia retusa*, Latreille, Cuvier Regne Animal (2) IV. p. 60.]

[*Camposcia retusa*, Guérin, Icon. Regn. Anim. Crust., pl. ix. fig. 1.]

Camposcia retusa, Latr. Milne-Edwards, Hist. Nat. Crust. I. 283, pl. xv. figs. 15 and 16.

Camposcia retusa, Cuvier, Regne Animal, Crust., pl. xxxii. fig. 1.

Camposcia retusa, Adams and White, Zool. 'Samarang,' Crust., p. 6.

Camposcia retusa, Bleeker, Recherches Crust. de l'Ind. Archipel., p. 7.

Camposcia retusa, Stimpson, Proc. Acad. Nat. Sci. Philad., 1857, p. 218.

Camposcia retusa, A. Milne-Edwards, Nouv. Archiv. du Mus., VIII. 1872, p. 255.

Camposcia retusa, Brocchi, Ann. Sci. Nat. (6) II. 1875, Art. 2, p. 89, pl. xviii. fig. 156 (male appendages).

Camposcia retusa, Hilgendorf, Monatsber. Akad. Berl., 1878, p. 784.

Camposcia retusa, Haswell, Proc. Linn. Soc., N. S. Wales, IV. 1879, p. 433; and Cat. Austr. Stalk and Sessile-eyed Crust., p. 4.

Camposcia retusa, E. Nauck, Zeits. Wiss. Zool., xxxiv. 1880, p. 38 (gastric teeth).

Camposcia retusa, Miers, Zool. 'Alert,' pp. 181, 189, 516, and 520.

Camposcia retusa, De Man, Archiv. f. Naturgesch. LIII. 1887, Bd. i. p. 219.

Camposcia retusa, C. W. S. Aurivillius, Kongl. Sv. Vet. Akad. Handl., XXIII. 1888–89, No. 4, p. 35.

Camposcia retusa, A. Ortmann, Zool. Jahrb., Syst., etc., VII. 1893, p. 35.

[*Camposcia retusa*, F. Müller, Verh. Ges. Basel, VIII. p. 473.]

Carapace pyriform, thin, but well calcified. The whole body and

most of the appendages thickly setaceous, and densely encrusted with sponges, zoophytes, algæ, etc. Rostrum broad, extremely short, somewhat deflexed, slightly emarginate.

Eye-stalks long, recurved, retractile to the sides of the carapace, and towards a slender acute post-ocular spine. Owing to the imperfection of the rostrum the interantennular spine is not developed, so that both the antennules fold into a common chamber.

The antennæ, which are completely exposed from the base of the 2nd joint, have the basal joint long and slender, and the free joints of the peduncle flat and densely setaceous.

The hairy external maxillipeds have the antero-internal angle of the ischium produced into a long narrow lobe, parallel to the narrow meropodite.

The chelipeds in both sexes are slender and are about equal in length to the carapace: in the male they are stouter than in the female, and also differ in having the palms inflated: the fingers in both sexes are closely apposable and are toothed throughout.

The other trunk-legs increase in length from the 2nd pair (which are a little longer than the chelipeds) to the 4th pair (which are twice as long as the chelipeds): the 5th pair, again, being only as long as the 3rd pair.

The abdomen in the adults of both sexes is broad and sub-circular, almost entirely covering the sternum, and consists of seven separate segments.

In the Museum collection are adult males and egg-laden females from the Andamans, Cocos, Ceylon and Samoa — the last being from the collection of the Museum Godeffroy.

Alliance II. INACHOIDA.

INACHOIDES, Edw. & Lucas.

Inachoides, Milne-Edwards and Lucas, in D'Orbigny Voy. Amer. Merid., Crust. pp. 4 & 5.

Inachoides, Miers, Journ. Linn. Soc., Zool., Vol. XIV. p. 646.

Inachoides, A. Milne-Edwards, Miss. Sci. Mex., etc., Crust., etc., I. p. 198.

Carapace pyriform much narrowed in front, inflated behind, the regions well delimited. Rostrum simple. Eyes not, or slightly, retractile towards the sides of the carapace; never, in any position, concealed. Pre-ocular and post-ocular spines distinct — especially the latter.

Basal antennal joint long and slender: its antero-external angle visible from above, on either side of the rostrum, as an acute spine:

the rest of the antennal peduncle, and the flagellum, completely exposed from above.

Epistome broad. External maxillipeds with the merus as broad as the ischium, completely closing the mouth.

Chelipeds in the male rather longer than any of the other legs, and with a long somewhat inflated palm. Ambulatory legs of moderate length, slender, and ending in a styliform dactylus which in some cases is spinulate along the posterior border.

Abdomen of the male composed of seven distinct segments, that of the female of five.

Inachoides dolichorhynchus, Alcock & Anderson. Plate IV. figs. 1, 1a.

Inachoides dolichorhynchus, Alcock and Anderson: Journ. As. Soc., Bengal, Pt. ii. 1894, p. 206.

Carapace elongate-triangular. Rostrum as long as the carapace, simple, spiny, acute. The regions of the carapace are well defined, and are distantly spiny, the following spines being the most conspicuous:— (1) on each side a supra-ocular, a post-ocular (hepatic), and four branchial; (2) in the middle line, a gastric, a cardiac, and an intestinal.

The eyes, though to a certain extent retractile towards the sides of the carapace, are in all positions completely exposed.

The antennæ, which are exposed from the end of the basal joint, are long—more than three-fourths the length of the carapace: their basal joint is long, slender, flattened and fused with the neighbouring parts, and has its antero-external angle produced into an acute spine: the second and third joints are knobbed distally.

The chelipeds are long—one-fourth longer than the carapace and rostrum combined: their palm, which forms about two-fifths of their total extent and is nearly three times the length of the fingers, is broadened and moderately inflated. The 2nd pair of trunk-legs are about equal in length to the chelipeds, but the 4th and 5th pairs are not much more than half that length.

Length of carapace and rostrum 17·5 millim.; greatest breadth 8 millim.; greatest span 54 millim.

Off Madras Coast.

ENCEPHALOIDES, Wood-Mason.

Nearly related to *Inachoides*.

Carapace, owing to the remarkable inflation of the branchial regions, heart-shaped and posteriorly as broad as long (rostrum included): the branchial regions meeting across the carapace in the middle line. Ros-

trum simple, shaped like the beak of a bird. Eyes retractile against the sides of the carapace : a small pre-ocular and post-ocular spine, but no definite orbit.

Basal antennal joint slender throughout : the antennæ visible, dorsally, from the base of the second joint.

Merus of the external maxillipeds produced antero-externally to form a foliaceous lobe which covers the greatly produced efferent branchial orifice.

Abdomen in the male seven-jointed : in the female the fourth, fifth and sixth segments, though distinctly recognizable, are firmly fused together.

Chelipeds in both sexes slender. Legs long and slender.

Only eight branchiæ on either side.

Encephaloides armstrongi, Wood-Mason.

Encephaloides armstrongi, Wood-Mason, Ann. Mag. Nat. Hist., March, 1891 p. 259.

Carapace heartshaped : its greatest breadth is equal to its length with the rostrum : its surface in the adult is nodular or pustular, in the young coarsely spiny. The gastric and hepatic regions are well-defined ; but the cardiac and intestinal regions are entirely concealed by the branchial regions, which rise up like a pair of mammæ, and meet, but without any fusion of walls, down the middle line.

The rostrum, which is shaped exactly like the beak of a bird, is about one-fourth the length of the carapace proper, and has a finely serrated edge.

In the male the abdomen is distinctly seven-jointed ; but in the female the fourth, fifth and sixth segments are immovably sutured together.

The eyes which are small, slender, and unpigmented, are retractile against the side of the carapace : there is a very narrow supra-orbital eave ending anteriorly in a minute tooth, and there is a small post-ocular spinule.

On the dorsal aspect the antennæ are plainly visible on either side of the rostrum, from the base of the 2nd joint of the peduncle : the flagella, which are of hairlike tenuity, hardly surpass the tip of the rostrum.

Owing to the prolongation of the efferent branchial canal, the front edge of the buccal frame is V-shaped, and the merus of the external maxillipeds ear-shaped.

The trunk-legs recall those of *Egeria*, being all long, slender, cylindrical, and quite devoid of hairs or spines: the chelipeds are short, and are not stouter than the ambulatory legs.

For proportions, see *Ann. Mag. Nat. Hist.*, March, 1891, p. 260.

APOCREMNUS, A. Milne-Edwards.

Apocremnus, A. Milne-Edwards, *Miss. Sci. Mex., etc., Crust., etc., I.* p. 184.

Apocremnus, Miers, 'Challenger' *Brachyura*, p. 17.

Carapace triangular or pyriform, much narrowed in front, inflated behind. Rostrum bifid. Eyes imperfectly retractile: a strong supra-ocular, but no post-ocular spine [a distant hepatic spine must not be mistaken for a post-ocular spine]. Basal antennal joint narrow, its antero-external angle forming a strong spine visible from above on either side of the rostrum: the free joints of the peduncle and the flagellum exposed to dorsal view. Epistome broad. External maxillipeds with the merus at least as broad as the ischium, quite closing the mouth-frame. Chelipeds not much enlarged: the other legs short and slender, with slender dactyli capable of some flexion on the penultimate joint. Abdomen in the male six jointed—(in the female four (?) jointed).

The genus *Apocremnus* has never yet been reported from Eastern Seas. It was first described from the Florida coast, and was afterwards reported by the 'Challenger' from Fernando Noronha (an island in the South Atlantic, off the coast of Brazil). There is nothing unprecedented therefore in its occurrence in deepish water in the Indian Ocean.

Apocremnus indicus, n. sp. Plate IV. figs. 2, 2a.

Carapace pyriform, inflated in the branchial, constricted in the post-ocular region, and armed with six long knob-headed spines, as follows:—one, semi-erect, above the root of either eye-stalk; one in the middle of the cardiac region, flanked on either side by one in the middle of each branchial region; one in the middle line on the posterior border. There are, in addition, on either side, two sharp spines, one above the other, near the middle of the hepatic region, and far from the eye.

The rostrum is formed of two short, slightly divergent, knob-headed spines. On either side of its base are seen the antennæ and a large spine formed by the antero-external angle of the basal antennal joint.

The constituent segments of the sternum are sharply granular, and are separated from one another by deep grooves.

The eye-stalks are of moderate length, salient, and almost immovable.

The buccal orifice is large, and the external maxillipeds are ornamented with lines of fine sharp-cut granulation: their merus is as broad as the ischium, and is excavated near the middle for the insertion of the palp. The chelipeds, in the male, are somewhat longer than the carapace and rostrum: their ischium, merus, and carpus are ornamented with lines of fine sharp granulation: the palms are elongate and compressed, with the edges carinate: the fingers, which are less than half the length of the palm, are compressed and curved.

The ambulatory legs, which decrease in length gradually, have their bases and meropodites granular, and the dactyli very slender.

The length of the carapace of the largest specimen—a male—is 9 millim., of an egg-laden female 6 millim.

From off the Andamans at about 100 fathoms, and off Ceylon at 32 to 34 fathoms.

COLLODES, Stimpson.

Collodes, Stimpson, Ann. Lyc. Nat. Hist., New York, Vol. VII. 1862, p. 193.

Collodes, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 645.

Carapace ovate-triangular. Rostrum short, bifid, with the lobes approximate. Eyes of moderate length, retractile against a strong post-ocular process which affords no concealment. Basal antennal joint narrow, a little curved, anteriorly bidentate, one tooth placed behind the other; mobile part of the antennæ exposed. External maxillipeds with the merus as broad as the ischium, completely covering the mouth. Chelipeds of moderate size. Ambulatory legs short, prehensile, with slender dactyli which in length are equal to their propodites, and are retractile against the latter. Abdomen of the female consisting of five segments.

Collodes malabaricus, n. sp. Plate V. fig. 3.

Carapace ovate-triangular, with the gastric and cardiac regions distinct and elevated. Rostrum short, emarginate. Pre-ocular spine large and coarse, post-ocular spine very prominent. A tubercle on the cardiac region, and a large epibranchial spine on either side of it.

Basal antennal joint narrow throughout, and bearing two spines anteriorly—one at the antero-external angle, visible from above, and comparable in size to one of the rostral teeth—and one behind this, immediately in front of the base of the eye-stalk. Eyes slender and

retractile towards the post-ocular tooth, which, however, affords no concealment.

Chelipeds (in the female) hardly stouter than the ambulatory legs, which are short, with prehensile dactyli.

Two ovigerous females, the larger of which is 4 millim. long, from off the Malabar Coast, 26 to 31 fathoms.

The genus *Collodes* has hitherto been known only as a tropical American genus. It has been found on both sides of Central America so that its occurrence in Indian waters is not without precedent.

Sub-family II. ACANTHONYCHINÆ.

Eyes without true orbits: eye-stalks little movable, either short and more or less concealed beneath a forwardly-directed supra-ocular spine, or obsolescent and almost or completely sunk either in the sides of a huge beak-like rostrum, or between low pre-ocular and post-ocular excrescences (*Sphenocarcinus*): a distinct post-ocular spine, which is not cupped, may be present (*Pugettia*). Basal antennal joint truncate-triangular.

External maxillipeds with the merus as broad as the ischium, and with the (small) palp arising from the antero-internal angle of the merus.

Dactyli of the ambulatory legs prehensile or sub-chelate, in the former case the last three pairs of legs are often disproportionately short compared with the second pair. Rostrum either simple or two-spined.

Key to the Indian genera.

I. Rostrum of huge size; simple, or bifid at tip; not flanked on either side by salient supra-ocular spines.	{	1. Eye-stalks almost obsolete, completely sunk, and almost or quite immovable:	{	i. Carapace and rostrum sub-cylindrical, the latter bifid at tip.....	XENOCARCINUS.
		carapace smooth or tuberculate: no post-ocular process.		ii. Carapace depressed, elongate-triangular: rostrum laterally compressed, not bifid at tip.....	
		2. Eye-stalks short, sunken but movable between low smooth pre-ocular and post-ocular excrescences: carapace with huge symmetrical pedicled tablets.....			SPHENOCARCINUS.

II. Rostrum flanked on either side by salient supra-ocular spines; either long and simple, or consisting of two spines of moderate length: no post-ocular process.	{	{	i. Rostrum laterally compressed, supra-ocular spines small: eye-stalks so short and deeply sunken as to hardly reach to the sides of the carapace; carapace of the female with large foliaceous lateral lobes.....	HUENIA.
			ii. Rostrum horizontally compressed, supra-ocular spines large: eye-stalks short, but reaching beyond the sides of the carapace: carapace of the female without foliaceous lobes	
		1. Carapace elongate-triangular, rostrum elongate, simple: ambulatory legs not subchelate.		
		2. Carapace broad, sub-quadrangular: rostrum short and deeply bifid, ambulatory legs subchelate		ACANTHONYX.

XENOCARCINUS, White.

Xenocarcinus, White, Jukes' Voyage H. M. S. 'Fly,' Vol. II. p. 335.
Huenioides, A. Milne-Edwards, Ann. Soc. Entomol. France (4) V. 1865, p. 144.
Xenocarcinus, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 648, pl. xii.
fig. 5.

Carapace ovate-subcylindrical, tapering to a long thick subcylindrical rostrum, or beak, the tip of which is emarginate or bifid.

Eyes short, completely sunken in the sides of the rostrum, almost immovable: no præ-ocular or post-ocular spines.

Antennæ with the basal joint triangular, and with the short mobile portion hidden beneath the rostrum.

External maxillipeds with the merus as broad as the ischium and giving attachment to the palp at its antero-internal angle.

Chelipeds not much shorter or stouter than the 2nd and 3rd pairs of legs: 4th and 5th pairs of legs short: all with the dactyli short, stout, curved, and sharply toothed along the posterior surface.

Abdomen of the female four-jointed, the 3rd—6th segments being fused together.

Xenocarcinus tuberculatus, White.

Xenocarcinus tuberculatus, White, P. Z. S., 1847, p. 119, and Ann. Mag. Nat. Hist. (2) I., 1848, p. 221, and in Jukes' Voyage H. M. S. 'Fly,' Vol. II. p. 336.

Xenocarcinus tuberculatus, Hess, Archiv. f. Naturges. XXXI. i. 1865, pp. 131 and 171.

Xenocarcinus tuberculatus, A. Milne-Edwards, Nouv. Archiv. du Mus. VIII. 1872, p. 253, pl. xii. fig. 1.

Xenocarcinus tuberculatus, Miers, Zool. 'Erebus' and 'Terror,' Crust., p. 1, pl. ii. fig. 1, 1e.

Xenocarcinus tuberculatus, Haswell, P. L. S., N. S. Wales, Vol. IV. 1879, p. 436, and Cat. Austr. Crust., p. 8.

Xenocarcinus tuberculatus, Ortmann, Zool. Jahrb. Syst., etc., VII. 1893, p. 40.

Carapace elongate ovate-subcylindrical with the regions ill defined and the surface more or less tuberculated. [Typically the tubercles fall into distinct transverse rows]. The rostrum has the form of a long coarse cylindrical beak, the apex of which is bifid, and the surface densely covered with velvety hairs.

The eyes are completely and almost immovably sunk in the sides of the rostrum.

The antennary flagella are much shorter than, and are completely hidden by, the rostrum.

The chelipeds and ambulatory legs are short and nodular, the latter having curved strongly-toothed prehensile dactyli. The chelipeds are hardly stouter, and are not much shorter, than the 2nd pair of legs, which again are much longer than the 3rd to 5th pair. The colours described by White are "two or three waved longitudinal red lines on the posterior half of the carapace, the inner line continued before the eyes." By A. Milne-Edwards the colours of the carapace and legs are said to be reddish stained with yellow.

In a good spirit specimen the abdomen carapace and beak are dull reddish brown, with a broad yellow stripe extending from the base of the beak to the tip of the abdomen, and on either side of the carapace a narrow sinuous yellow line; and the trunk-legs are yellow, more or less banded and striped with dull brown.

In the Museum collection are two females, one from Ceylon (34 fathoms), the other from the Andamans. The one from Ceylon, which is an egg-laden adult 15 millim. long, resembles as to its carapace and rostrum, but not as to its legs, the figure in the Zoology of the 'Erebus' and 'Terror;' and as to its legs, but not as to its carapace and rostrum, the figure in Archiv. du Mus. tom. VIII. 1872. The other, from the Andamans, which is not adult, exactly resembles, as to its carapace, but not as to its legs, the last cited figure.

SPHENOCARCINUS, A. Milne-Edwards.

Sphenocarcinus, A. Milne-Edwards, Miss. Sci. Mex., Crust., I., p. 135.

Sphenocarcinus, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 663; and 'Challenger' Brachyura, p. 34.

Carapace elongate sub-pentagonal, broad behind, tapering in front to a long rostrum formed of two spines (fused together to near the tip). The surface of the carapace is symmetrically and deeply honey-combed by broad deep channels which leave symmetrical tubercles with overhanging edges between them.

There are no true pre-ocular and post-ocular spines, but the eye is deeply sunk between two low smooth excrescences which are pre-ocular and post-ocular in position.

The basal antennal joint is truncate-triangular, and the antennary flagella are completely hidden beneath the rostrum. The epistome is long and narrow. The external maxillipeds have the merus as broad as the ischium, somewhat dilated at the antero-external angle, and somewhat excavated at the antero-internal angle for the insertion of the small palp. The chelipeds are not much stouter, and not much shorter than the next pair of legs, which are the longest: the dactyli of the legs, though stout recurved and prehensile, are not toothed along the posterior edge. Abdomen, in both sexes, seven-jointed.

Oxypleurodon Miers ('Challenger' Brachyura, p. 38) differs from *Sphenocarcinus* only in the form of the rostrum, the spines of which are divergent instead of convergent and more or less fused. I much suspect the generic value of this character. If, however, the two forms be identical, then *Sphenocarcinus* would have to be removed to the next sub-family, in which case the sub-family Acanthonychinae would be perfectly homogeneous.

Sphenocarcinus cuneus (Wood-Mason).

Oxypleurodon cuneus, Wood-Mason, Ann. Mag. Nat. Hist., (6) VII. 1891, p. 261.

Carapace elongate sub-pentagonal, narrowing to a long tapering cylindrical rostrum, which, in the male, is longer than the carapace and only emarginate at the extreme tip, but, in the female, is shorter than the carapace and distinctly bifid at the end.

The carapace is symmetrically honey-combed by deep channels, which leave between them great symmetrically undermined islets, as follows:—one, very elongate-oval, on the gastric region; one, triangular, on the cardiac region; one, somewhat semilunar with one horn

much produced laterally, on each branchial region; and one, Cupid's bow-shaped, along the posterior border. Besides these there are some smaller islet-like excrescences, namely, on each side, a supra-ocular, post-ocular, hepatic, and branchial.

Between the supra and post-ocular excrescences, are set the small squat little-movable eyes.

Of the trunk-legs, the 2nd pair (*i.e.*, first ambulatory legs) are the longest, being very slightly longer than the chelipeds, and considerably shorter than the carapace measured with the rostrum, but much longer than any of the last 3 pairs of legs.

In the female all the long joints, except the dactyli, and in the male all except the dactyli and propodites, are strongly carinated dorsally.

The chelipeds are hardly stouter than the next pair of legs, except as regards the palm in the male, which is broadened and somewhat inflated. In neither sex are the short white polished fingers apposable throughout.

	Male.		Female.	
Length of carapace and rostrum	...	19· millim.	...	18·5 millim.
Greatest breadth of carapace	...	12· „	...	13· „
Length of rostrum alone	...	10·5 „	...	8·7 „
„ of 2nd pair of trunk-legs	...	15·5 „	...	15· „
<i>Loc.</i> Andaman Sea, 161 to 250 fathoms.				

This extremely elegant species has been figured for next year's issue of "Illustrations of the Zoology of the 'Investigator.' "

HUENIA, de Haan.

Huenia, de Haan, Faun. Japon. Crust., p. 83

Huenia, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 648; and 'Challenger' Brachyura, p. 34.

Carapace depressed, elongate-triangular in the male,* with the lateral epibranchial angles produced; sub-quadrangular in the female, with two large foliaceous lobes (epibranchial and hepatic) on either side: a small pre-ocular, but no post-ocular spine. Rostrum simple, acute, vertically deep, laterally compressed. Abdomen in the male seven-jointed; in the female five-jointed; with the fourth to the sixth joints coalescent.

Eyes very small and almost immobile.

* A small hepatic lobe is sometimes present in the male also, on either side.

Basal antennal joint somewhat enlarged, and coalescent at its distal extremity with the front; beneath which the flagella are inserted out of sight in a dorsal view.

The external maxillipeds are small, the merus distally truncated, and bearing the palp at its antero-internal angle. Chelipeds in the male moderately developed, with the palms compressed and cristate above, the fingers somewhat excavated at the tips, and not apposable throughout their extent. Ambulatory legs short—the longest pair not much longer than the chelipeds, dactyli short, stout, strongly recurved, and more or less toothed along the posterior margin.

Huenia proteus, de Haan.

Maja (*Huenia*) *proteus*, de Haan, Faun. Japon. Crust., p. 95, pl. xxiii. figs. 4–6.

Huenia proteus, Adams and White, 'Samarang' Crustacea, p. 21, pl. iv. figs. 4–7, and p. 22, pl. iv. fig. 5.

Huenia proteus, Haswell, Proc. L. S., N. S. Wales, Vol. IV. 1879, p. 437; and Cat. Austr. Crust., p. 9.

Huenia proteus, Miers, Zool. 'Alert,' pp. 182 and 191, and 'Challenger' Brachyura, p. 35.

Huenia proteus, C. W. S. Aurivillius, Kongl. Svensk. Vet. Akad. Handl. XXIII. 1888-89, No. 4, p. 40, pl. iii. fig. 3.

Huenia proteus, R. I. Pocock, Ann. Mag. Nat. Hist. (6) V. 1890, p. 79.

Huenia proteus, Henderson, Trans. Linn. Soc., Zool. (2) V. 1893, p. 341.

Huenia proteus, Ortmann, Zool. Jahrb., Syst., etc., VII. 1893, p. 40.

Carapace flat, depressed, with two low elevations in the middle line, otherwise smooth: in the male the carapace is elongate triangular, with the lateral epibranchial angles produced to form small lobes, and sometimes with the hepatic regions expanded in the same way: in the female the carapace is quadrilobate, owing to the foliaceous extension of the hepatic and epibranchial angles. Rostrum long, simple, acute, deep, and laterally compressed. Supra-ocular spines small. Eyes small, deeply sunk beneath the pre-ocular spine, almost immovable.

In the male the chelipeds are somewhat shorter, and the next pair of legs (which are the longest) are somewhat longer than the carapace and rostrum combined: in the female the chelipeds are considerably shorter than, and the next pair of legs are about the same length as, the carapace and rostrum. In the female and young male the fingers, which are closely toothed, meet throughout the greater part of their extent: in the male they meet only at the tips.

The last three pairs of legs are very short. All the long joints, except the dactyli, of all the trunk-legs are more or less carinate dorsally (anteriorly), the carination often being more or less discontinuous in the case of the chelipeds: the dactyli of the ambulatory legs are stout, strongly recurved, and more or less toothed along the posterior margin.

In the Museum collection there are several females, but only two males, from various parts of the Andamans, up to 20 fathoms.

SIMOCARCINUS, Miers.

Simocarcinus, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 649.

As *Huenia*, but without the supra-ocular spine; with the chelipeds much stouter, especially as to the palm, which is much inflated; and with the ambulatory legs more cylindrical.

Simocarcinus pyramidatus (Heller).

Huenia pyramidata, Heller, Crust. Roth. Meer., in SB. Akad. Wien XLIII. 1861 p. 307, pl. i. fig. 9.

Description of the Male.

Carapace elongate-triangular, narrowing to a huge, deep, laterally compressed rostrum of greater length than the carapace: the hepatic regions are marked by a faint bulge, and the lateral epibranchial angles are very sharp cut, while the limits of the posterior border are bounded on either side by a small lobule. Except for a somewhat elongate eminence on the gastric region and a tubercle on the posterior cardiac region, the carapace is perfectly smooth.

The eyes are deeply sunk, and nearly immobile, and the cornea is somewhat deficient in pigment.

The chelipeds, which are markedly stouter than the other legs, are a little shorter than the carapace and rostrum; and the next pair of legs, which are a good deal more than twice the length of the 3rd pair and than thrice the length of the 5th pair, are equal in length to the carapace and rostrum. The palms are broadly inflated; and the fingers, which are strongly arched, meet only at the tips.

The ambulatory legs are cylindrical, and their dactyli are stout, strongly recurved, and toothed along the posterior margin.

Our single perfect specimen—a male from the Nicobars—measures 30 millim. in length of carapace and rostrum.

Simocarcinus simplex (Dana).

Huenia simplex and *brevirostrata*, Dana, U. S. Expl. Exp. Crust. I. pp. 133 and 134, pl. vi. figs. 3a-c, 4a-c.

Simocarcinus simplex, Miers, Jour. Linn. Soc., Zool., Vol. XIV. 1879, p. 649; and 'Challenger' Brachyura, p. 35 (*ubi synon.*).

[*Simocarcinus simplex*, Cano, Boll. Soc. Nat. Napol. III. 1889, p. 173.]

Simocarcinus simplex, J. R. Henderson, Tr. Linn. Soc. Zool. (2) V. 1893, p. 342.

This species is distinguished from *Simocarcinus pyramidatus* (Hell.) (1) by the much shorter rostrum of the male; (2) by the presence of

three tubercles, disposed in a triangle, on the gastric region; (3) by the larger and more prominent eyes; (4) by the absence of the lobule on either side of the posterior border of the carapace; (5) by the much more massive chelipeds of the male.

This species is included in the Indian Fauna on the authority of Prof. J. R. Henderson. There are no specimens in the Indian Museum.

MENÆTHIUS, Edw.

Menæthius, Milne-Edwards, Hist. Nat. Crust. I. 338.

Menæthius, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 649; and 'Challenger' Brachyura, p. 36.

Carapace subpyriform, moderately convex, and tuberculated on the dorsal surface, with a large triangulate præ-ocular spine, but no post-ocular spine. Rostrum simple, slender, acute, or emarginate at apex. Post-abdomen in the male seven-jointed, in the female usually five-jointed, the penultimate joint formed by the coalescence of three segments. Eyes small, mobile, but not perfectly retractile. Basal antennal joint slightly wider at the base than at the distal extremity, which is unarmed; flagellum exposed and visible from above at the side of the rostrum. Merus of the exterior ~~antenna~~ articulated with the distal extremity and with a ~~pre~~ well developed, with the palm slightly notched at the antero~~ate~~, and having between them, when the next joint. Chelinae base. Ambulatory legs of moderate length; slightly compress~~ed~~ical, not dilated or compressed; dactyli slightly closed, an int~~ally~~ally retractile. (Miers).

the joint⁺

cu^r *Menæthius monoceros*, (Latr.) Edw.

[*Pisa monoceros*, Latr., Encycl. X. 139.]

Inachus arabicus, Rüppell, Krab. Roth. Meer., p. 24, pl. v. fig. 4.

Menæthius monoceros, Milne-Edwards, Hist. Nat. Crust., Vol. I. p. 339.

Menæthius subserratus, *porcellus*, and *tuberculatus*, Adams and White, 'Samarang' Crustacea, pp. 18 and 19, pl. iv. figs. 1 and 2.

Menæthius angustus, *depressus*, *subserratus*, *tuberculatus*, *areolatus* and *inornatus*, Dana, U. S. Expl. Exped., Crust. I. pp. 121-125, pl. iv. figs 5a-7g, and pl. v. figs. 1a-3d.

Menæthius subserratus, *dentatus* and *depressus*, Stimpson, Proc. Ac. Nat. Sci. Philad., 1857, p. 219.

Menæthius monoceros, Heller, Crust Roth. Meer., SB. AK. Wien, XLIII. 1861, p. 306.

Menæthius monoceros, A. Milne-Edwards in Maillard's L'île Réunion, Annexe F, p. 6; and *rugosus* p. 7, pl. xvii. fig. 2.

MENÆTHIUS MONOCEROS, A. MILNE-EDWARDS, NOUVELLES ARCHIVES DU MUSEUM IV. 1868, p. 70, and VIII. 1872, pp. 252 and 253 (UBL. SYNON.)

Menæthius monoceros, Miers, Phil. Trans. Vol. 168, 1879, p. 485, and Zoology 'Alert,' pp. 182, 190, 517 and 521, and 'Challenger' Brachyura, p. 37.

Menæthius monoceros, Haswell, P. L. S., N. S. Wales, Vol. IV. 1879, p. 437, and Cat. Austr. Crust., p. 9.

Menæthius monoceros, de Man, Notes Leyden Mus. II. 1880, p. 171, and Archiv. f. Naturges. LIII. 1887, i. 219.

Menæthius monoceros, Richters in Möbius Meeresf. Mauritius, p. 145.

[*Menæthius monoceros*, Cano. Boll. Soc. Nat. Napol. III. 1889, p. 175.]

Menæthius monoceros, Henderson, Trans. Linn. Soc. Zool. (2) V. 1893, p. 342.

Menæthius monoceros, Ortmann, Zool. Jahrb. Syst., etc., VII. 1893, p. 41.

Carapace elongate-triangular, most markedly so in the male, the lateral epibranchial angles sharp-cut, and the surface very variably tuberculated.

The rostrum, which is flanked on either side by the forwardly-directed supra-ocular spine, is styliform, acute, and horizontally compressed, its length being about half that of the carapace in the male, but a good deal less in the female.

The small eyes are imperfectly retractile, and project freely from beneath the supra-ocular spine.

The chelipeds in the male are as long as, or a little longer than, the 2nd pair of legs, or about equal in length to the carapace and rostrum: they are very much stouter than any of the other legs, and have a good deal shorter than the cannot stouter than the other legs, and are considerably shorter and fingers which meet only at the tips.

through the greater part of their exterior of legs, which, again, are a pair: in all the dactyli are strongly recurved a

The 3rd-5th pair of legs are very much stouter than the 2nd pair: the fingers meet at the posterior margin. than the 2nd

Very numerous specimens from the Andamans and Nicobars along

ACANTHONYX, Latr.

[*Acanthonyx*, Latreille, Regne Animal, (2) IV. 58.]

Acanthonyx, Milne-Edwards, Hist. Nat. Crust. I. 342.

Acanthonyx, A. Milne-Edwards, Miss. Sci. Mex., Crust. I. 142.

Acanthonyx, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 650; and 'Challenger' Brachyura, p. 42.

Carapace sub-oblong, rounded behind, and with the dorsal surface usually depressed, not markedly constricted behind the prominent antero-lateral angles, the lateral branchial spines small and not prominent. Præ-ocular spine prominent, acute. Spines of the rostrum united at the base, acute and but little divergent. Post-abdomen in the male six-jointed. Eyes small, mobile, but not completely retractile. Basal an-

tennal joint narrowing slightly from the base to the distal extremity, which is unarmed; flagellum exposed and visible from above at the side of the rostrum. Merus of the exterior maxillipeds truncated at the distal extremity and but slightly notched at the antero-internal angle, where it is articulated with the next joint. Chelipeds (in the adult male) well developed; palm compressed, but slightly turgid in the middle, and often slightly carinated above; fingers acute, and having between them, when closed, an interspace at the base. Ambulatory legs short, with the penultimate joints more or less dilated and compressed and armed with a tooth or lobe on its inferior margin, against which the small acute dactylus closes. (Miers).

Acanthonyx macleayi, Krauss.

Acanthonyx macleayi, Krauss, Sudafrican. Crust., p. 47, pl. iii. fig. 6.

Acanthonyx macleayi, Miers, 'Challenger' Brachyura, p. 43.

Carapace sub-quadrangular, with the hepatic and lateral branchial spines well developed: these spines, as well as the spines of the rostrum and the carapace immediately behind the rostrum, are tufted with setæ; and on the gastric region in a line with the hepatic spines are two elevated tufts of setæ. Except for the spines and elevations above-mentioned, and for a slight median elevation in its posterior half, the carapace, both as to its margins and as to its surface, is perfectly smooth and unarmed.

The supra-ocular spines are parallel with, and in the female almost comparable in size with the rostral spines.

The chelipeds in the male, but not in the female, are much stouter than any of the other legs: in the male they are nearly as long as the carapace, and have the carpus and palms much inflated, and the fingers in contact only at their tips: in the female they are only about two-thirds the length of the carapace, and have the joints slender, and the fingers closely apposable throughout.

The other legs, which are subchelate, are not disproportionately short compared with the chelipeds: the last pair is sub-dorsal in position.

In the Museum collection are specimens from Karáchi.

Acanthonyx consobrinus, A. Milne-Edwards.

Acanthonyx consobrinus, A. Milne-Edwards, in Maillard's l'Ile de la Réunion, Annexe F. p. 7, pl. xvii. figs. 3, 3b.

Acanthonyx consobrinus, Heller, 'Novara' Crustacea, p. 5.

"Carapace broadened, and a little swollen, surface non-granular. Gastric region with three ill-defined tubercles. Cardiac region either smooth or with sometimes a trace of a rudimentary tubercle. Latero-

anterior border cut into four or five teeth, of which the first, or external orbital angle, is small and pointed, the second larger *et à extrémité mousse*, and the others successively smaller. The rostrum consists of two short stout spines, and the supra-ocular border forms a spine. Chelipeds short: fingers evenly toothed. Ambulatory legs ending in a recurved claw. The abdomen of the male consists of 5 segments, the 2nd, 3rd and 4th being fused together.

There are no specimens of this species in the Museum Collection, which is included in this Fauna on the authority of Dr. Heller who mentions it in the 'Novara' Collection, from Madras.

The genus or sub-genus *Scyramathia* has, I think, very close affinities with the genus *Pugettia*, and is certainly, I think, a close link between this sub-family and the following.

Sub-family iii. PISINÆ.

Eyes with commencing orbits, of which one of the most characteristic parts is a large, blunt, usually isolated and cupped post-ocular tooth or lobe, into which the eye is retractile, but never to such an extent as to completely conceal the cornea from dorsal view: there is also almost always a prominent supra-ocular eave, the anterior angle of which is sometimes produced forwards as a spine. Eye-stalks short. Basal antennal joint broad, at any rate at the base; its anterior angle generally produced to form a tooth or spine. Merus of the external maxillipeds, owing to the expansion of its antero-external angle, broader than the ischium, and carrying the palp at its antero-internal angle. Rostrum two-spined (in *Doclea* obscurely so). Legs often very long.

Key to the Indian Genera.

Alliance 1. PISOIDA. Supra-ocular eave not in close contact with the post-ocular spine or process, and generally produced, but not very conspicuously, at the antero-external angle in the plane of the rostrum.

- I. Spines of the rostrum separate from the base, usually long and divergent.

1. Post-ocular tooth either not cupped, or if cupped then the carapace is armed with long acute spines of uniformly large size and regular arrangement SCYRAMATHIA.

2. Post-ocular tooth deeply cupped; spines of the carapace, if present, never of uniform size and arrangement.

i. Spines of the rostrum bearing a secondary spinule, either at tip or somewhere in their distal half NAXIA.

ii. Spines of the rostrum without a secondary spinule HYASTENUS.

- II. Spines of the rostrum coalescent in their basal half.

1. Carapace sub-circular or globular: rostrum emarginate: ambulatory legs of moderate length, stout: the entire body, and the appendages in great part, densely tomentose DOCLEA.

2. Carapace broadly triangular: tip of the rostrum deeply cleft: ambulatory legs extremely long and slender.

i. Post-ocular lobe completely isolated both from the supra-ocular eave and from the basal antennal joint: 2nd pair of trunk-legs never approaching six times the length of the carapace... CHORILIBINIA.

ii. Space between the post-ocular lobe and the supra-ocular eave, as well as that between the post-ocular lobe and the basal antennal joint occupied by a spine: 2nd pair of trunk-legs six or more times the length of the carapace..... EGERIA.

Alliance 2. LISSOIDA. Supra-ocular eave in the closest contact with the post-ocular process, and with its antero-external angle almost always (always in Indian genera) very strongly produced forwards in the plane of the rostrum.

- i. Surface of carapace tubercular: chelipeds of the male stouter than those of the female: abdomen of the female seven-jointed..... TYLOCARCINUS.

ii. Surface of carapace spiny: chelipeds of the male not stouter than those of the female: abdomen of the female five-jointed..... HOPLOPHRYS.

Alliance I. PISOIDA.

SCYRAMATHIA, A. Milne-Edwards.

Scyramathia, A. Milne-Edwards, Compt. Rend. XCI. 1881, p. 356.
Scyramathia, Sars, Norwegian North-Atlantic Expedn., Crustacea I^A. p. 5.
Scyramathia, S. I. Smith, 'Albatross' Crustacea (1884), 1886, p. 21.
Anamathia (part) Miers, 'Challenger' Brachyura, p. 25.

Carapace pyriform or elongate-triangular, armed either with tubercles, or with long spines much like those of *Anamathia* in their uniform size and definite arrangement: the hepatic and lateral epi-

branchial spines are always prominent and very conspicuous. The rostrum consists of two spines, which are usually long and slender. The eyes are small, and are retractile against a sharp post-ocular process which commonly is but little cupped: there is also a supra-ocular eave which terminates either in a forwardly directed tooth or in an upturned spine. Basal antennal joint not very broad, sharply truncated: the mobile portion of the antennæ freely exposed on either side of the rostrum.

Merus of the external maxillipeds as broad as the ischium, slightly expanded at the antero-external angle, and bearing the palp at the antero-internal angle.

Chelipeds in the adult male (but not in the female and young male) enlarged, with the palms broadened and compressed.

First pair of ambulatory legs markedly the longest.

The abdomen in both sexes consists of seven distinct segments.

There is certainly a close superficial resemblance between this genus and *Anamathia*; but I quite agree with Prof. Sars that the two forms are not very closely united. Prof. Sars thinks that *Scyramathia* is nearest to *Hyastenus*, an opinion with which I concur, although I also think that there are quite as close relations to *Pugettia*.

Scyramathia pulchra, Miers.

Anamathia pulchra, Miers, 'Challenger' Brachyura, p. 26, pl. iv. fig. 1 (adult male).

Anamathia livermorii, Wood-Mason, Ann. Mag. Nat. Hist. March 1891, p. 260 (young male and adult female).

Body and limbs everywhere closely covered with short hairs, which on the carapace are peg-shaped; and with numerous long scattered setæ. The carapace, which is subpyriform, is armed with twenty long sharp spines disposed in five longitudinal series. Of these spines five are on the gastric region, one is on the cardiac, and one on the intestinal region, one stands above either eye, one on each hepatic, and four on each branchial region: in addition there is a distinctly cupped post-ocular lobe.

The rostrum consists of two slender divergent spines, the length of which is more than half that of the carapace.

The eyes are small, and the cornea, though retractile against the post-ocular lobe, can never be concealed.

The basal antennal joint is broad, and has its antero-external angle somewhat produced: the mobile portion of the antenna is completely exposed to dorsal view.

The external maxillipeds have the ischium and merus somewhat concave.

The chelipeds vary according to sex. In the adult male they are longer than the carapace and rostrum, and are far stouter than any of the other legs: the carpus is enlarged and sculptured, the palm is broadened, as well as somewhat carinate along both edges and strongly produced at the postero-inferior angle, and the fingers are opposable in their distal half only: in the female and young male they are shorter than the carapace with the rostrum, and are hardly stouter than the other legs; all the joints are subcylindrical, and the fingers are appposable in the greater part of their extent.

In both sexes, the merus of all the legs, including the chelipeds, has a spine or tooth at the far end of its upper margin. The 2nd pair of trunk-legs, which are the longest, are, in the male, nearly twice the length of the carapace and rostrum, but in the female are considerably shorter.

Loc. Andaman Sea, 130 to 561 fathoms.

Scyramathia rivers-andersoni, n. sp.

Carapace closely covered with peg-shaped hairs with long setæ interspersed: legs with few setæ. The carapace, which is pyriform and somewhat inflated, has, besides a supra-ocular tooth and a sharp post-ocular process, and besides a salient hepatic spine, and a still more salient lateral epibranchial spine (about two-fifths the greatest breadth of the carapace in length) six sharply conical tubercles evenly and equidistantly arranged in a circle round a central cardiac tubercle: of these the most posterior overhangs the middle of the posterior border, while the most anterior, which is situated far back on the gastric region, is flanked on either side by a very faint eminence.

The rostrum consists of two slender divergent horns, the length of which in the male is about three-quarters, in the female about two-thirds, that of the rest of the carapace.

The eyes are small, and though freely movable forwards are not retractile backwards further than to impinge against the summit of the post-ocular process of the carapace. The basal antennal joint, which is of no great width, is sharply truncated: the mobile portion of the antenna is freely exposed on either side of the rostrum.

The chelipeds in the fully adult male (but not in the young male) are much stouter than the other legs, and are as long as the carapace and rostrum; their merus is prismatic with knife-like edges, the upper edge ending in a spine; their carpus is bicarinate, the outer carina being very prominent; the hands, which form nearly half their total

length, have the palm carinate along the upper edge, and the fingers slightly separated when closed.

In the female the chelipeds are not stouter than the other legs, are not much longer than the carapace proper, and have the fingers closely apposable throughout.

Of the ambulatory legs the first are much the longest, being nearly half again as long as the carapace and rostrum; while the last two pairs are very short and have their dactyli reduced in length, increased in strength, and strongly recurved.

	Male.	Female.
Length of carapace and rostrum...	21 millim.	16·5 millim.
„ rostrum ...	9 „	7 „
„ chelipeds ...	21 „	11 „
„ 2nd pair of trunk-legs...	31 „	20 „
„ 5th ...	15 „	11 „

Loc. Off Malabar coast, 406 fms.

Scyramathia beauchampi (Alcock and Anderson).

Anamathia beauchampi, Alcock and Anderson, J. A. S. B., 1894, Pt. ii. p. 185.

Body and legs downy, and with numerous large coarse curly clavate hairs, which are very regularly arranged on the legs, where also they are coarsest and closest. Carapace sub-triangular, with the following armature :—

On either hepatic region a great up-curved earlike spine (without any bullous base). On either branchial region, posteriorly, a strong up-turned spine; and anteriorly, near the middle line, a smaller coarse tooth. On the gastric region four sharpish tubercles. On the narrow sunken cardiac region a coarse sharp tooth. On the posterior border, in the middle line, a coarse granule.

The rostrum consists of two more (♀) or less (♂) divergent spines, the length of which is about one-third that of the rest of the carapace.

The eyes are small, and are almost devoid of pigment: they are to some extent hidden beneath a pre-ocular tooth of moderate dimensions, and are retractile against a larger laterally-compressed post-ocular plate.

The antennæ are completely exposed, from the base of the second joint of the peduncle.

The chelipeds in the male are massive, and in length are more than half again as long as the carapace and rostrum: all their joints, from

the ischium to the propodite, have one or more of their edges conspicuously and sharply cristiform, this being specially well marked in the case of the long trigonal meropodite, which has all its edges sharply phalanged, and in the case of the equally long slightly inflated palm, which has razor-like edges. The fingers, which are not nearly half the length of the palm, are acute, and have their cutting edges entire.

The 2nd–5th pairs of legs are slender, with cylindrical joints, the 2nd are nearly or quite equal in length to the chelipeds, the 3rd–5th decrease gradually in size.

In an adult female, equal in size to the male above described, the chelipeds are shorter than the 2nd pair of legs, and are similar in general proportions to the other legs.

Colours in life: “Earth-colour with the chelipeds pink.”

	Male.		Female (adult.)
Length of carapace (including rostrum)...	18 millim. ...		15·5 millim.
Greatest breadth of carapace	... 12·5	,, ...	11·5
Length of cheliped	... 29	,, ...	14
Greatest breadth of palm	... 4·5	,, ...	1

Loc. Bay of Bengal, 193 and 210 fathoms.

The ova are large (diam. 1 millim.) and rather few in number.

In young males the chelipeds are of proportions intermediate between those of the adult male and female.

Scyramathia globulifera, Wood-Mason.

Pugettia globulifera, Wood-Mason, Ann. Mag. Nat. Hist. March, 1891, p. 260.

Distinguished by the vertically erect ear-like hepatic spine, the base of which forms a great polished bulla on either side of the buccal frame, giving the animal, when viewed front end on, a bat-like appearance.

The body and legs are downy, the legs being fringed with short broad curly hairs.

The carapace, in which the cardiac region is broad and prominent and not, as in *S. beauchampi*, narrow and sunken, has, besides the hepatic spine already mentioned, the following marks:—

On the branchial regions, below and anteriorly, a sharp sinuous human-ear-shaped crest; above and posteriorly a spine; and near the middle line anteriorly an acumination. On the gastric region four faint

elevations. On the cardiac region, and also on the intestinal region, in the middle line, an acuminate eminence.

The rostrum consists of two divergent spines, about one-third the length of the rest of the carapace.

The eyes stand well out from beneath the pre-ocular spine, and are retractile against a small post-ocular tooth.

The other appendages closely resemble those of the preceding species; but the chelipeds, in the adult male, are shorter, being only equal in length to the carapace and rostrum, and the fingers have their cutting edges crenulate instead of smooth.

In females and in young males the chelipeds have the same relative proportions as in *Scyramathia beauchampi*.

	Male.		Female (adult).	
Length of carapace (including rostrum)...	17	millim....	13	millim.
Greatest breadth of carapace...	10	„ ...	7·5	„
Length of cheliped ...	18	„ ...	9·5	„
Greatest breadth of palm ...	4	„ ...	1·2	„

Loc. Andaman Sea, 130–240 fathoms.

Miers *Pugettia velutina* ('Challenger' Brachyura, p. 41, pl. vi. figs. 2, 2a, 2b) should, I think, be placed in this sub-genus — *Scyramathia*.

HYASTENUS, White.

Hyastenus, White, P. Z. S., 1847, p. 56.

Hyastenus, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 658 (*et synonym.*); and 'Challenger' Brachyura, p. 55.

Chorilia and *Lahainia*, Dana, U. S. Expl. Exp. Crust. I. pp. 91 and 92.

Carapace subpyriform, convex, either smooth or tuberculate, sometimes spiny. Supra-ocular eave very prominent, usually somewhat acuminate produced anteriorly: post-ocular spine, or lobe, large and excavated. The rostrum consists of two usually long slender divergent spines. Eye-stalks short, retractile against the post-ocular lobe, but never to the complete concealment of the cornea.

Basal antennal joint broad, its antero-external angle sometimes produced: the mobile portion of the antenna usually exposed to dorsal view.

Merus of the external maxillipeds as broad as, or broader than, the ischium, expanded at the antero-external angle, and bearing the palp at the antero-internal angle.

Chelipeds in the adult male enlarged: the second pair of trunk-legs usually very much longer than the 3rd 4th and 5th pairs.

The abdomen in both sexes consists of seven distinct segments.

Key to the Indian species of Hyastenus.

- | | | | |
|---|--|--|------------------------|
| | | i. Rostral spines as long as the carapace, and nearly parallel in their proximal half: carapace indistinctly tuberculated | [<i>H. sebæ.</i>] |
| | 1. Rostral spines at least as long as the carapace proper. | ii. Rostral spines about twice as long as the carapace, and widely divergent from their origin: carapace with numerous tubercles, and with large cardiac, branchial and intestinal spines: a long terminal spine on the merus of the second pair of trunk-legs | <i>H. tenuicornis.</i> |
| I. Denuded carapace with numerous tubercles, or spines, and erosions. | 2. Rostral spines not much more than half the length of the carapace proper. | i. Legs coarse, the meropodites of all (including the chelipeds) nodular. <div> a. Numerous tubercles forming a cross on the gastric region: a median transverse tubercle in the groove between the gastric and cardiac regions..... <div> <i>H. pleione.</i> </div> </div> <div> b. Gastric region almost smooth: no tubercle between the gastric and cardiac regions..... <div> <i>H. hilgendorfi.</i> </div> </div> | |
| | | ii. Legs slender, the meropodites smooth. <div> a. Carapace elongate closely covered with granules and tubercles, without spines..... <div> <i>H. oryx.</i> </div> </div> <div> b. Conspicuously large spines on the cardiac and branchial regions..... <div> <i>H. gracilirostris.</i> </div> </div> | |

II. Denuded carapace smooth and polished, with a few large spines.	1. Carapace triangular, with a large epibranchial spine and at least one large sub-hepatic tubercle on either side.	i. A large intestinal and two large gastric spines in the middle line.....	<i>H. spinosus.</i>
		ii. No large intestinal spine: a single gastric tubercle in the middle line.....	<i>H. diacanthus.</i>
	2. Carapace elongate, with a small epibranchial tubercle, and with none of the sub-hepatic tubercles enlarged.	i. A pair of gastric tubercles in the middle line.....	<i>H. aries.</i>
		ii. Gastric region without tubercles. <div><div>a. An erect claw-like intestinal spine</div><div>b. No intestinal spine.....</div></div>	<div><i>H. calvarius.</i></div> <div><i>H. planasius.</i></div>

Hyastenus pleione (Herbst).

Cancer pleione, Herbst, Krabben, III. iii. 52, taf. lviii. fig. 5.
Naxia pleione, Gerstaecker. Archiv. fur Naturgesch. XXII. 1856, p. 114, taf. v. figs. 1-2.
Hyastenus pleione, A. Milne-Edwards, Nouv. Archiv. du Mus. VIII. 1872, p. 250.
Hyastenus pleione, de Man, Archiv. fur Naturgesch. LIII. 1887, p. 225, taf. vii. fig. 3; and Journ. Linn Soc., Zool., Vol. XXII. 1888, p. 18.
Hyastenus pleione, Miers, 'Challenger' Brachyura, p. 56.
Hyastenus pleione, J. R. Henderson, Trans. Linn. Soc. (2) V. 1893, p. 343.

Carapace triangular, elegantly rounded behind, pubescent like the legs and rostrum, the regions well-defined, tuberculated as follows:—six tubercles disposed in a Y or cross on the gastric region, one in the groove between the gastric and the extremely prominent cardiac region, one in the middle of the intestinal region, and three in a line on the boundary of the hepatic and pterygostomian regions; on either branchial region are two longitudinal rows of tubercles, the upper row being the more distinct, but the last tubercle in the lower row being the largest, and forming a rather prominent epibranchial spine; finally on either side of the groove separating the cardiac and intestinal regions is a prominent tooth.

The rostrum consists of two slender divergent spines, which in the male are half the length of the carapace proper, but in the female are considerably less.

The basal antennal joint has its outer margin, anteriorly, bilobed.

The hairy trunk-legs have the upper surface somewhat uneven or actually nodular.

The chelipeds in the male are stouter than the other legs, and are as

long as the carapace *plus* half the rostrum ; the fingers, which are hardly one half shorter than the short palm, are arched and meet only near their tips : in the female the chelipeds are rather more slender than the other legs, are only as long as the post-ocular portion of the carapace, and have nearly straight fingers that meet in the greater part of their extent.

The second pair of legs, in both sexes, are considerably longer than the chelipeds and than any of the three last pairs : the dactyli of all the ambulatory legs are stout, recurved, and serrated along the posterior margin.

In the Museum collection are numerous specimens of both sexes, from Ceylon and Mergui.

Hyastenus hilgendorfi, de Man.

Hyastenus hilgendorfi, de Man, Journ. Linn. Soc., Zool., Vol. XXII. 1888, p. 14, pl. i. figs. 3 and 4.

This species much resembles *H. pleione*, but is distinguished by the following constant characters :—the carapace is but faintly tuberculated, and, in particular, there is no tubercle between the gastric and cardiac regions : the dactyli of the ambulatory legs are very strongly toothed, instead of merely serrated, along the posterior margin : in the male the rostrum is nearly two-thirds the length of the carapace, and the chelipeds are as long as the carapace and rostrum combined, and nearly as long as the second pair of trunk-legs,—this being largely due to the increased length of the palm.

Carapace subpyriform, and, like the rostrum and legs, pubescent ; the regions moderately well-defined.

The gastric region is either quite smooth, or presents three faint elevations disposed in a triangle base forwards. There is a small tubercle near the middle of the intestinal region ; and a line of granulations along the boundary between the hepatic and pterygostomian regions, which line is continued backwards, along the side of the branchial region, to end at a distinct lateral epibranchial spine : there is also a more or less distinct line of granules on the dorsal aspect of the epibranchial region.

The rostrum consists of two divergent spines, the length of which in the male is nearly two-thirds that of the carapace proper, but is considerably less in the female. Basal antennal joint with the outer margin sinuously curved.

The trunk-legs have the surface somewhat uneven : the chelipeds in the male are much stouter than the other legs, and are as long as the

carapace and rostrum, the palm being nearly twice the length of the fingers, which are not much arched and meet in their distal half: in the female the chelipeds are rather slenderer than the other legs, and are equal to the postrostral portion of the carapace in length. The 2nd pair of legs are hardly longer than the (male) chelipeds, but are very much longer than the last three pairs: the dactyli in all are stout, recurved, and strongly toothed along the posterior margin.

Specimens are in the Museum collection from Ceylon, Ganjam, Mergui, the Nicobars, and the Straits of Malacca.

Hyastenus diacanthus (de Haan).

Pisa (Naxia) diacantha, de Haan, Faun. Japon. Crust., p. 96, pl. xxiv. fig. 1.

Naxia diacantha, Adams and White, 'Samarang' Crust., p. 10.

Naxia diacantha, Stimpson, Proc. Acad. Nat. Sci. Philad. 1857, p. 218.

Naxia diacantha, Heller, 'Novara' Crust., p. 3.

Hyastenus diacanthus, A. Milne-Edwards, Nouv. Archiv. du Mus. VIII. 1872, p. 250.

Naxia diacantha, Brocchi, Ann. Sci. Nat. (6) II. 1875, Art. 2, p. 94, pl. xix. figs. 172, 173 (male appendages).

Hyastenus diacanthus, Miers, Cat. Crust. New Zealand, p. 9; and P. Z. S., 1879, pp. 19 and 26; and Zoology H. M. S. 'Alert,' pp. 182 and 194; and 'Challenger' Brachyura, p. 57.

Hyastenus diacanthus, Haswell, P. L. S., N. S. Wales, Vol. IV. 1879, p. 442; and Cat. Austral. Crust., p. 20.

Hyastenus diacanthus, de Man, Archiv. fur Naturgesch., LIII. 1887, p. 220.

Naxia diacantha, C. W. S. Aurivillius, Kongl. Sv. Vet. Akad. Handl. XXIII. 1888-89, No. 4, p. 51, pl. ii. fig. 5.

[*Hyastenus diacanthus*, Cano, Boll. Soc. Nat. Napol. III. 1889, p. 178.]

Hyastenus diacanthus, A. O. Walker, Journ. Linn. Soc., Zool., Vol. XX. 1890, p. 109.

Hyastenus diacanthus, Ortmann, Zool. Jahrb., Syst., etc., VII. 1893, p. 55; and Zool. Forsch. Austral. Malay. Archip., Jena., 1894, p. 42.

Hyastenus diacanthus, Mary Rathbun, Proc. U. S. Nat. Mus. Vol. XVI. 1893, p. 85.

Body and legs densely tomentose, often much encrusted with sponges, etc. Carapace pyriform, with the regions strongly convex, well-defined, and when denuded, smooth and polished: on the gastric region, in the middle line, there is an acuminate tubercle, on either pterygostomian region at least one large tooth, and near the hinder limit of either branchial region a horizontally projecting lateral epibranchial spine.

The rostrum consists of two more or less divergent horns, the length of which in the adult male is from half to nearly two-thirds that of the carapace proper, but in the female is less. The basal antennal joint is much inflated behind and constricted in front.

The chelipeds in the male are stouter than any of the other legs, and are equal in length to the carapace *plus* half the rostrum; the fingers, which are arched and meet in rather less than their distal half, are nearly as long as the short inflated palm. In the female and young male the chelipeds are rather more slender than any of the other legs, and in length are equal to the post-ocular portion of the carapace; and the fingers, which are almost straight, meet in the greater part of their extent. The second pair of trunk-legs are nearly twice the length of the (male) chelipeds, and are far longer than any of the last three pairs: the recurved and densely tomentose dactyli have the posterior margin almost smooth.

Besides specimens from the Australian and Chinese Seas, the Museum possesses specimens from Ceylon, Orissa, Tavoy, and the Andamans.

Hyastenus spinosus, A. Milne-Edwards.

Hyastenus spinosus, A. Milne-Edwards, Nouv. Archiv. du Mus., VIII. 1872, p. 250.

Hyastenus spinosus, Miers, 'Challenger' Brachyura, p. 56.

This species differ from *H. diacanthus* only in the following particulars:—the body and limbs are less densely tomentose; the gastric region, instead of a single acuminate tubercle, has two strong spines in the middle line; there is a stout spine, in the middle line, close to the posterior border of the carapace; the lateral epibranchial spines are larger.

These differences are constant in a large series of specimens from different parts of the sea-coast of India: but in two specimens which seem referable to this species the gastric region is quite smooth, though abnormally convex.

Hyastenus aries (Latr.)

[*Pisa aries*, Latr. Encyc. X. p. 140].

Chorinus aries, Milne-Edwards, Hist. Nat. Crust. I. 315.

Hyastenus aries, A. Milne-Edwards, Nouv. Archiv. du Mus., VIII. 1872, p. 250.

Chorinus aries, Hilgendorf, MB. Ak. Wiss. Berl. 1878, p. 786.

Chorinus aries, E. Nauck, Zeits. Wiss. Zool. XXXIV. 1880, p. 41 (gastric teeth).

Hyastenus aries, Miers, 'Challenger' Brachyura, p. 56.

Very closely resembling *H. spinosus*, from which it differs only in the following particulars—adult males of nearly equal size being compared:—(1) the rostral horns, instead of being long cylindrical divergent and down-curved only at tip, are short (being only one-third the length of the carapace proper in the male, and only about one-fourth

in the female), somewhat compressed horizontally, almost parallel or even a little incurved, and perceptibly though very slightly deflexed from the base; (2) the carapace is much more convex and swollen, with the lateral epibranchial and the median posterior spines much smaller; (3) the chelipeds have the palm less enlarged, and the fingers nearly straight, instead of arched; (4) the anterior angle of the supra-orbital eave, instead of being sharply produced, is obtuse.

The Museum possesses specimens from the Orissa Coast and Gulf of Martaban, and also from the Straits of Malacca.

Hyastenus planasius, Ad. & White.

Pisa planasia, Adams and White, 'Samarang' Crust., p. 9, pl. ii. figs. 4 and 5.

Hyastenus planasius, A. Milne-Edwards, Nouv. Archiv. du Mus., VIII. 1872, p. 250.

Hyastenus (Chorilia) planasius, Miers, Zoology H. M. S. 'Alert,' pp. 182 and 196; and 'Challenger' Brachyura, p. 57.

Hyastenus planasius, Walker, Journ. Linn. Soc. Zool. Vol. XX. p. 109.

Carapace elongate-ovate, its surface smooth and polished anteriorly, finely granulose posteriorly, and with scattered tufts of hairs: a small eminence in the middle of the gastric region, and a small lateral epibranchial spinule, in front of which latter there may be a line of granules: lateral margin with three spinules anteriorly, two of which are on the pterygostomian region.

The rostrum is formed by two parallel spines, the tips of which are somewhat incurved, and the length of which is about one-sixth that of the carapace proper. The supra-ocular margin is, as usual, very prominent, and has its anterior angle somewhat produced. The antero-external angle of the basal antennal joint forms a distinct tooth visible from above. The legs are tomentose with additional long scattered setæ: the second pair (1st ambulatory legs) are, as usual, markedly the longest, being half again as long as the carapace and rostrum: the dactyli are short, stout, recurved, and serrated posteriorly. The chelipeds are described by Adams and White as follows:—"small, slender, equal in size, covered with scattered long stout hairs; the third joint sub-cylindrical, curved inwards and enlarged anteriorly; fourth joint short, rounded, and curved, with two small tubercles on the outer and upper surface; fifth joint rather slender, sub-cylindrical, laterally compressed; claws slightly gaping in the middle, curved inwards, and finely denticulated." As, however, the male specimen figured does not seem to be adult, these characters are perhaps changeable with age.

In the Museum collection are a young male and female from Ganjam and Arrakan.

Hyastenus calvarius, n. sp.

This species—females alone being available for comparison—differs from *H. planasius* chiefly in the following characters:—(1) there is an erect claw-like spine on the posterior border of the carapace in the middle line; (2) the spines of the rostrum are straight, divergent, and about half the length of the carapace; (3) the dactyli are longer and slenderer.

Three females—two of which are laden with eggs—from the Andamans. The larger egg-laden female measures 14 millim. from the tip of the rostrum to the posterior border of the carapace.

Description of the female.

Carapace elongate-ovate, with the surface, when denuded of scattered setæ, smooth and polished: the gastric region is very convex: the only armature of the carapace is (1) a large erect claw-like spine near the posterior border in the middle line, (2) a small lateral epibranchial spinule on either side, and (3) two or three granules along the antero-lateral border in the pterygostomian region. The rostrum is formed of two straight divergent spines, the length of which is about half that of the carapace proper. The antero-lateral angle of the prominent supra-ocular eave is sharp; and that of the basal antennal joint is produced to form a spine which is plainly visible from above.

The legs are more or less fringed with stout club-shaped hairs: the second pair are, as usual, the longest: the dactyli are long and slender, and are recurved, with the posterior margin serrate. The chelipeds are slender, and the fingers meet in the greater part of their extent.

Hyastenus sebæ, White.

Seba, Thesaurus, III. xviii. 12.

Hyastenus sebæ, White, P. Z. S., 1847, p. 57; and Ann. Mag. Nat. Hist., Vol. XX. 1847, p. 61; and 'Samarang' Crustacea, p. 11.

Hyastenus sebæ, A. Milne-Edwards, Nouv. Archiv. du Mus., VIII. 1872, p. 249.

Hyastenus sebæ, de Man, Archiv. fur Naturgesch., LIII. 1887, p. 223.

Hyastenus sebæ, Miers, 'Challenger' Brachyura, p. 56.

Hyastenus sebæ, Ortmann, Zool. Forsch. Austral. Malay. Archip. Jena, 1894, p. 42.

Carapace very elongate-triangular, its surface eroded and sculptured, but without distinct tubercles or spines. The rostral spines, which are equal in length to the carapace, are paralld in their proximal half. The chelipeds in the male are equal in length to the carapace *plus* one-third of the rostrum: their merus is not much stouter than that of the next pair of legs, but the palm is broadened and somewhat inflated: the fingers, which are hardly more than half the length of

the palm, are arched, and meet only at the tip. The other legs are slender, the second pair being much longer than the last three pairs and longer than the chelipeds.

The Museum possesses a specimen from Mauritius, which I have included here for the sake of comparison.

Hyastenus oryx, A. Milne-Edwards.

Hyastenus oryx, A. Milne-Edwards, *Nouv. Archiv. du Mus.*, VIII. 1872, p. 250, pl. xiv. fig. 1.

Hyastenus oryx, Haswell, *Proc. Linn. Soc., N. S. Wales*, Vol. IV. 1879, p. 442; and *Cat Austral. Crust.*, p. 20.

Hyastenus (Chorilia) oryx, Miers, *Zool. H. M. S. 'Alert'*, pp. 182 and 195, 517 and 522; and *'Challenger' Brachyura*, p. 58.

Hyastenus oryx, de Man, *Archiv. fur Naturgesch.*, LIII. 1887, p. 224, taf. vii. fig. 2.

Hyastenus oryx, C. W. S. Aurivillius, *Kongl. Sv. Vet. Akad. Handl.* XXIII. 1888-89, No. 4, p. 50, pl. iv. fig. 4.

Hyastenus oryx, A. O. Walker, *Journ. Linn. Soc., Zool.*, Vol. XX. 1890, p. 109.

Carapace pyriform, little setose, crisply and rather closely tuberculated, but without any spines, the tubercles on the gastric region being disposed in the form of a cross or anchor. The rostrum consists of two slender horns, which in the male are about half the length of the carapace proper, and strongly resemble the horns of an *Oryx* in miniature: in the female they are not one-third the length of the carapace, and are nearly parallel.

The supra-ocular eave is sharply angled, but not produced, anteriorly. The basal antennal joint is sharply toothed at the antero-external angle.

The chelipeds in the male are as long as the carapace *plus* two-thirds of the rostrum: their merus is slender, but the palms are broadened and inflated; and the fingers, which are from half to two-thirds the length of the palm, are arched, and meet only at the tip. In the female the chelipeds are considerably shorter than the post-ocular portion of the carapace, and are rather more slender than the ambulatory legs, the fingers being but little arched, and little separated when clenched.

The ambulatory legs are slender, with slender almost smooth actyli: the first pair, which are considerably the longest, are about one-fourth longer than the carapace and rostrum.

This, like *Hyastenus calvarius*, is a small species, an egg-laden female of average size measuring only 14 millim. from the tip of the trum to the posterior border of the carapace. It is a common species at the Andamans, and has also been taken off Ceylon at 34 fathoms.

Hyastenus gracilirostris, Miers.

Hyastenus gracilirostris, Miers, Ann. Mag. Nat. Hist., Vol. IV. 1879, p. 12, pl. iv. fig. 7; and 'Challenger' Brachyura, p. 56.

Carapace subpyriform, hardly at all setose, with numerous sharp tubercles and spinules. Specially noticeable are three spinules, longitudinally arranged in the middle line, on the gastric region, a strong conical spine on the cardiac region, a sharp tubercle on the posterior margin, and two spines on each of the branchial regions, of which the larger occupies the usual position of the lateral epibranchial spine.

The rostrum, which does not vary according to sex, consists of two slender divergent spines, the length of which is about one-third that of the carapace. The post-ocular lobe projects very strongly, and the supra-ocular eave has both the anterior and the posterior angle pronounced. The basal antennal joint has a well-marked tubercle or blunt spine at its antero-external angle.

The chelipeds in the male are equal in length to the post-rostral portion of the carapace, and have a few small granules on the merus carpus and upper edge of the palm; the merus is slender, but the palm is broadened and is not much longer than the fingers, which are arched and meet only at the tip. In the female the chelipeds are rather shorter than the post-ocular portion of the carapace, are very slender, and have nearly straight fingers.

The ambulatory legs are slender, with slender smooth-edged dactyli: the first pair are, as usual, much the longest.

This also is a small species, and egg-laden female of average size being only 10 millim. in length.

In the Museum collection are specimens from the Madras coast.

Hyastenus tenuicornis, Pocock.

Hyastenus tenuicornis, Pocock, Ann. Mag. Nat. Hist., Vol. V. 1890, p. 76.

Distinguished by the enormous length of the rostral spines, and by the curious form—described below—of the supra-ocular eave and post-ocular lobe.

Carapace subpyriform, somewhat depressed, with the regions well-defined; its surface with many long scattered setæ, and with numerous granules and some large spines. Specially noticeable are five or seven granules, arranged in the form of a cross, on the gastric region; two huge acuminate tubercles, in the middle line, posteriorly; and three spines on either branchial region, the hindmost and lowermost of which is of great size.

The rostrum consists of two slender, exceedingly divergent spines,

the length of which in the male is about twice, in the female about once and a fifth, that of the carapace.

The post-ocular lobe is unique in form: it is very prominent, and has a stout pedicle and a compressed crown, the angles of which are produced. The supra-ocular eave is also unique: it also is very prominent, and has its antero-external angle produced forwards and upwards, and its postero-external angle produced backwards towards the post-ocular lobe. The basal antennal joint is deeply grooved longitudinally: its antero-external angle forms a strong spine visible from above, and its outer edge bears two distinct teeth which stretch towards the supra-ocular and post-ocular spines respectively. All the trunk-legs are very slender: the first two pairs have a strong spine on the far end of the upper border of the merus, but this in the last three pairs is represented by a small tubercle. The chelipeds, even in the male, are slender throughout, and have long slender fluted palms which are three times the length of the fingers: the latter, though denticulated throughout and but little arched, meet, in the male, only in their distal half.

The first pair of ambulatory legs are, as usual, much the longest: in all the dactyli are long and slender, but have the posterior edge sharply serrated.

This also is a small species, an egg-laden female of average size measuring only 17 millim., more than half of which is rostrum.

Off Cheduba (Arakan coast) 7 fathoms: off Ceylon 30–34 fathoms.

Dr. Henderson (Tr. Linn. Soc., Zool., 1893, p. 344) also includes in the Indian Fauna, but with some doubt, the two following species:—

1. *Hyastenus convexus*, Miers Zool., H. M. S. 'Alert,' p. 196, pl. xviii. fig. B. (*N. E. Australia*; *Penang*).

2. *Hyastenus brockii*, de Man, Archiv. fur Naturgesch. LIII., 1887, p. 221, taf. vii. fig. 1. (*Amboina*).

As Dr. Henderson seems to be not quite sure of his identification, and as we have no specimens in the Museum collection, I have not noticed these two species at length.

NAXIA, Edw., Miers.

Naxia, Milne-Edwards, Hist Nat. Crust. I. 313.

Naxia, de Haan, Faun, Japon. Crust., p. 84.

Naxia, Miers, Journ. Linn. Soc., Zool., Vol XIV. 1879, p. 658 (*et synonym. Naxioides*, A. M. Edw. and Podopisa *Hilgendorf*); and 'Challenger' Brachyura, p. 59.

Carapace subpyriform, moderately convex, rounded behind, and armed with spines or tubercles on the dorsal surface. Spines of the

rostrum well developed, subcylindrical, parallel or divergent, and bearing on the inner margin, near to the extremity, a small accessory spine or spinule. Abdomen (in the male) distinctly seven-jointed; in the female some of the segments may be coalescent. Eyes small, supra-ocular eave very prominent, its antero-external angle sometimes produced to a spine: post-ocular lobe also very prominent, its edge unequally bi- or tri-lobed. Antennæ with the basal joint enlarged, with a spine or tubercle at the antero-lateral angle, and sometimes with another on the outer margin; the flagellum either exposed, or partially concealed in a dorsal view by the rostral spines. Merus of the external maxillipeds distally truncated, with the antero-external angle little, if at all, produced, and the antero-internal angle emarginate. Chelipeds (in the male) slender and moderately developed, palm usually somewhat elongated, fingers denticulated near the distal extremity, and having between them when closed a small hiatus at the base. Ambulatory legs slender and somewhat elongated, the first pair much the longest, with the joints subcylindrical; dactyli nearly straight.

Key to the Indian species of Naxia.

- I. Armature of the carapace consisting almost entirely of large clean-cut spines *N. hystrix.*
- II. Armature of the carapace consisting chiefly of tubercles, among which there are sometimes a few coarse spines.

1. Spines of the rostrum parallel to near the tip: supra-ocular spine obsolete: meropodites of the trunk-legs without a terminal spine..... *N. hirta.*

2. Spines of the rostrum divergent from the base: supra-ocular spine present: meropodites of some of the trunk-legs with a large terminal spine.

i. Spines of the rostrum considerably more than half the length of the carapace: supra-ocular spine very large and acute: meropodites of all the trunk-legs with a terminal spine: palms long and slender.

a. Rostral spines widely divergent: no large spines on the branchial or intestinal regions *N. taurus.*

b. Rostral spines moderately divergent: several large spines on the branchial regions and in the middle line of the carapace *N. cerastes.*

ii. Spines of the rostrum considerably less than half the length of the carapace: supra-ocular spine blunt: meropodites of the last three pairs of trunk-legs unarmed: palms short and inflated *N. investigatoris.*

Naxia investigatoris, n. sp. Pl. IV. fig. 3.

Distinguished from all other Indian species by the form of the male chelipeds, of which the palm, instead of being long and slender, is short and broadly inflated.

Carapace subpyriform, with all the regions well-defined, and the whole surface, from the base of the rostral spines, sharply tubercular.

The rostral spines in the male and sometimes in the female are hardly one-third the length of the carapace proper, and are divergent, with the accessory spine in the middle of the distal half: often, but not always, in the female they are less than one-fourth the length of the carapace, are little divergent, and bear the accessory spinule near the tip. The antero-external angle of the prominent supra-ocular eave is surmounted by a blunt spine: the basal antennal joint has a similar spine at its antero-external angle, and another near the middle of its outer border.

The chelipeds are granular, and their meropodite has a small spinule at the distal end of its upper border: in the male they are a little longer than the carapace, the palm is short—less than twice the length of the fingers—inflated, and enlarged from behind forwards, and the fingers are strongly arched and meet only at the tip: in the female they are only as long as the post-rostral portion of the carapace, are slender throughout, and have nearly straight fingers. The 2nd pair of trunk-legs (1st pair of ambulatory legs) are $2\frac{1}{2}$ times the length of the carapace, and have the meropodite armed with a strong spine at the distal end of its upper border, and the dactylus of remarkable length, nearly equal to the propodite: the other legs are much shorter, and have the spine replaced by a small tubercle, their dactylus being of ordinary length.

Colours in spirit, pale ochre.

Loc. Andamans; and off Ceylon, 34 fathoms.

	Male.	Ovigerous Female.
Length of carapace and rostrum ...	19 millim.	17 millim.
Greatest breadth of carapace ...	10·5 „	10 „
Length of chelipeds	23 „	14 „
Length of 2nd pair of legs ...	41 „	36 „

Naxia hirta, A. Milne-Edwards.

Naxioides hirta, A. Milne-Edwards, Ann. Soc. Ent. Fr. (4) V. 1865, p. 143, pl. iv. fig. 1.

Podopisa petersii, Hilgendorf, MB. Ak. Berl., 1878, p. 785, taf. i. figs. 1–5.

Naxia petersii, Miers, Zoology of H. M. S. 'Alert,' p. 523.

Naxia hirta, Miers, 'Challenger' Brachyura, p. 61.

Naxia petersii, de Man, Journ. Linn. Soc., Zool., Vol. XXII. 1888, p. 19.

Naxia hirta, Pocock, Ann. Mag. Nat. Hist., Vol. V. 1890, p. 79.

Naxia hirta, Henderson, Trans Linn. Soc., Zool. (2) V. 1893, p. 345.

Carapace pyriform, with the regions well-defined and the surface from the base of the rostral spines unevenly granular and tubercular. From the rough surface there stand out (1) at least two good sized spines on either branchial region, (2) a sharp unciform tubercle close to the posterior border near the middle line, and (3) a stout nipple-shaped tubercle near the middle of the pterygostomian region.

The rostral spines, which in both sexes are close together and parallel in more than half their extent, are from one-third (male) to two-sevenths (female) the length of the carapace proper; from the point of origin of the accessory spines, which are situated at the end of the parallel portion, they are elegantly divergent.

The prominent supra-ocular eave has the antero-external angle slightly upturned. The basal antennal joint has a stout spine anteriorly, and a coarse tooth in the middle of its outer border.

The chelipeds are smooth, and are slender in both sexes, but most so in the female: in the male they are equal in length to the post-rostral, in the female to the post-ocular portion of the carapace: the palms are slender and sub-cylindrical, and are twice the length of the fingers, which latter are hardly arched, and are therefore but slightly separated at the base when clenched.

All the ambulatory legs are slender and smooth, and the first pair are considerably the longest, being nearly twice the length of the carapace and rostrum, the dactylus not being abnormally elongate.

The body and legs are covered with a short fine down, and the colour in spirit is usually mottled reddish and yellow.

In the Museum collection are specimens from the Andamans and from Ceylon.

Naxia taurus, Pocock.

Naxia taurus, Pocock, Ann. Mag. Nat. Hist. Vol. V. 1890, pp. 77 and 79.

Naxia taurus, Henderson, Trans. Linn. Soc., Zool. (2) V. 1893, p. 346.

Distinguished by the very long and widely divergent rostral spines.

Carapace pyriform, with the regions well-defined, and the surface, from the base of the rostral spines, unevenly granular and tubercular beneath tufts of hair. Among the tubercles three on the gastric region in the middle line, three in a triangle on the intestinal region, and three on either branchial region attract attention.

The rostral spines, which are considerably more than half the carapace in length, are widely divergent—the distance between their tips being more than three-quarters of their length: the accessory spine is situated not far in front of the middle.

The prominent supra-ocular eave has a strong sharp spine, and there is an even stronger and sharper spine at the antero-external angle of the basal antennal joint, as well as a prominent tooth near the middle of the outer border of this joint.

The chelipeds are granular: in the male they are equal in length to the carapace *plus* four-fifths of the rostrum, and, though slender, are considerably stouter than the other legs, especially as to the palm, which is more than twice the length of the fingers—the fingers being but little curved and therefore but little separated when closed: the meropodite has a strong sharp spine at the distal end of its upper border.

The ambulatory legs are slender: the meropodites of all but the last pair are armed as to the distal end of the upper border with a spine, which is of conspicuous size in the case of the first pair. The first pair are markedly the longest, being nearly twice the length of the carapace measured with the long rostrum, and have the dactylus extremely long—nearly equal in length to the propodite.

A single male specimen occurs in the collection, having been dredged off the Andamans in 36 fathoms.

Naxia cerastes, Ortmann.

Naxia cerastes, Ortmann, in Semon, Zool. Forschungreisen Austral. und Malay. Archipel., Crust., p. 43, taf. iii. fig. 4.

This species appears to be very similar to *Naxia taurus*, with which it may, perhaps, even be identical. It differs from *Naxia taurus*, comparing specimens of the same size and sex, in the following unimportant particulars:—(1) the rostral spines are less divergent; (2) the carapace, in addition to the granules and tubercles, is armed with several large spines, of which three on either branchial region and one on the intestinal region are of conspicuous size, while several in the middle line on the gastric and cardiac regions are hardly smaller.

In the collection are a perfect male and female from the Andamans.

Naxia hystrix, Miers.

Naxia hystrix, Miers, 'Challenger' Brachyura, p. 60, pl. vi. fig. 4.

Naxia hystrix, R. I. Pocock, Ann. Mag. Nat. Hist., Vol. V. 1890, p. 79.

Naxia hystrix, Ortmann, Zool. Forsch. in Austral. und Malay. Archipel., Crust., p. 43.

Body closely beset with short knobbed hairs, among which longer setæ are interspersed.

Carapace subpyriform, armed with numerous long sharp spines as follows:—four, arranged in a triangle base forwards, on the gastric region; one on the cardiac, and one (very large) on the intestinal region; one on either hepatic region; two or three on either pterygostomian region; and, finally, on either branchial region three dorsal and three lateral: between these large spines some spinules and sharp granules are interspersed. In the male there is a pair of strong spines on the sternum between the chelipeds; and each abdominal tergum has a strong median spine: in the female five parallel rows of spines are found on the ventral surface, three of which belong to the abdominal terga, and one on either side to the sternum.

The rostral spines are short (about one-fifth the length of the carapace in the male, and rather less in the female), and divergent: the accessory spinule is found on their inner margin near the tip.

The basal antennal joint has a sharp spine at its antero-external angle, and a tooth near the middle of its outer margin. The antero-external angle of the prominent supra-ocular eave is surmounted by a sharp spine.

The chelipeds in the female and young male are rather more slender than the other legs, and are a little longer than the carapace and rostrum: the palms are slender and subcylindrical, and are nearly three times as long as the fingers, which are nearly straight and appposable throughout. The ambulatory legs are slender, and have very long slender dactyli: the first pair, which are much the longest, are nearly three times as long as the carapace and rostrum.

In the Museum collection are specimens from the Andaman Sea down to 40 fathoms.

CHORILIBINIA, Lockington, Miers.

Chorilibinia, Lockington, Proc. Ac. Nat. Sci. Calif., Vol. VII. 1876, p. 69.

Chorilibinia, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 45; and 'Challenger' Brachyura, p. 45.

Chlorolibinia, Haswell, Cat. Austral. Crust., p. 17.

Carapace broadly subpyriform, spinose. Rostrum formed of two spines which are coalescent in their basal half. The commencing orbit, which does not afford much concealment to the fully retracted eye, is formed by a little-prominent supra-ocular eave, and a cupped (and isolated) post-ocular tooth. The basal antennal joint is broad, has its antero-external angle more or less produced, and has also a lobe on its

outer margin, near the base. Merus of the external maxillipeds as broad as the ischium, and with the antero-external angle produced.

Chelipeds slender; ambulatory legs very long and slender. Abdomen of the male consisting of seven distinct segments.

Chorilibinia andamanica, n. sp. Plate V. figs. 2, 2a.

Distinguished from *Chorilibinia gracilipes*, Miers (Ann. Mag. Nat. Hist. Vol. IV. 1879, p. 7, pl. iv. fig. 4), (1) by the much less divergent rostral spines; (2) by the pair of great spines—one pointing forwards, the other backwards—on the cardiac region; (3) by the much slenderer chelipeds.

Carapace broadly subpyriform, with (1) a median line of tubercles and spines increasing in size from before backwards, four of the spines—namely one on the after limit of the gastric region, two on the cardiac region, and one near the posterior border—being conspicuously large; and with (2) on either side a supra-marginal line of spines as follows—a tooth at the angle of the buccal frame, a large hepatic spine pointing downwards, and four branchial spines, the last of which directed obliquely backwards is much the largest. Besides these large spines there are numerous, symmetrically disposed, sharp granules. The rostrum, which measured from the anterior border of the orbit is about one-third the length of the carapace proper, ends in two very slightly divergent spines.

The eyes are short and thick; and the orbit is formed by a moderately prominent supra-ocular eave separated by a narrow interval from a broad isolated post-ocular pocket.

The basal antennal joint is moderately broad, and bears two teeth, one at the antero-lateral angle, the other at the base—the latter inclining towards the post-ocular pocket.

The external maxillipeds completely close the buccal frame, the merus being as broad as the ischium.

The chelipeds are not stouter than the legs, and are but little longer than the carapace (rostrum included): the next pair of legs are considerably more than three times, and the third pair are about three times, this length; while the 4th and 5th pairs are very short.

The abdominal segments from the third to the sixth inclusive, are coalescent.

The sternum between the chelipeds carries a pair of very strong sharp teeth.

Loc. Andamans.

EGERIA, Leach.

Egeria, Leach, Zool. Miscell. Vol. II. p. 39.

Egeria, Milne-Edwards, Hist. Nat. Crust. I. 290.

Egeria, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 654; and 'Challenger' Brachyura, p. 44.

Carapace subpyriform, nearly as broad as long, convex and tuberculated. The rostrum consists of two vertically compressed spines of no great length, which are fused together in half or more of their extent. The eyes are short. The commencing orbits are formed by a supra-ocular eave and a post-ocular tooth, the interval between this tooth and the supra-ocular eave above, and between it and the basal antennal joint below, being partly closed in each case by a spine. The basal antennal joint is truncate-triangular; its antero-external angle is produced, and there is a second spine behind the middle of the outer border: the mobile portion of the antenna is visible from above on either side of the rostrum. The merus of the external maxillipeds is as broad as the ischium. Chelipeds in the adult male considerably longer than the carapace and rostrum, and having the palms inflated. Chelipeds in the female very slender throughout, and a little longer than the carapace and rostrum. Ambulatory legs extremely long and slender, the first pair being about six times the length of the carapace and rostrum: the dactylus in all is remarkably long. Abdomen of male seven-jointed: of female five-jointed.

Egeria arachnoides (Rumph), Edw.

Egeria arachnoides, Rumph, pl. viii. fig. 4; [and Latreille, Encyc. Pl. 281, fig. 1;] and Milne-Edwards, Hist. Nat. Crust., I. 291; and Neumann, Syst. Ūebers., 1878, p. 19; and Haswell, P. L. S., N. S. Wales, IV. 1879, p. 439, and Cat. Austr. Crust., p. 11; and Miers Zool. Alert, pp. 182 and 191, and 'Challenger' Brachyura, p. 44; and C. W. S. Aurivillius, Kongl. Sv. Vet. Ak. Handl., XXIII. 1888-89, No. 4, p. 44; and Ortmann, Zool. Jahrb. Syst. etc., VII. 1893, p. 48; and J. R. Henderson, Trans. Linn. Soc. Zool. (2) V. 1893, p. 343.

Cancer longipes, Herbst, Krabben, I. ii. 231, pl. xvi. fig. 93; and Fabricius Syst. Ent. ii. 466.

Inachus longipes, Fabr. Suppl., p. 358.

Macropus longipes, Latr. Hist. Nat. Crust. VI. 111.

Leptopus longipes, Lamk. Hist. An. Sansvert. V. 235; and Desmarest Consid. Crust. p. 159; [and Guérin, Icon. Reg. An. Crust., pl. x. fig. 3]; and Cuvier, Regne An. Crust., pl. xxxiv. fig. 1; and Adams and White, 'Samarang' Crust., p. 7; and Stimpson, Proc. Ac. Nat. Sci., Philad., 1857, p. 216; and A. O. Walker, Journ. Linn. Soc. Zool., XX. p. 109; and M. J. Rathbun, P. U. S. N. M., XVI. 1893, p. 95.

Egeria indica, Leach, Zool. Miscel. II. pl. lxxiii; and Desmarest, Consid. Crust., p. 157, pl. xxvi. fig. 2; and Milne-Edwards, Hist. Nat. Crust. I. 292; and Adams and White, 'Samarang' Crust., p. 6; and E. Nauck, Zeits. Wiss. Zool. XXXIV. 1880, p. 41 (gastric teeth).

Egeria herbstii, Milne-Edwards, Hist Nat. Crust. I. 292; and Heller, 'Novara' Crust., p. 4; and Haswell, P. L. S., N. S. Wales, IV. 1879, p. 439, and Cat. Austr. Crust., p. 12.

Our large series of perfect specimens fully supports Mr. Miers' conclusion that all the hitherto described species of *Egeria* may be regarded as identical with the species rather poorly figured in Rumph's *Amboinische Rariteitkamer*.

Carapace subpyriform, or, rostrum excluded, subcircular, its breadth being equal to its length behind the base of the eye-stalks: the regions are distinctly delimited, and the surface is uneven and armed with some symmetrically disposed spines and spinules of which the six following are very conspicuously large, namely:—in the middle line, one on the cardiac and one on the intestinal region, and, on either side, a sub-hepatic and a lateral epibranchial: besides these there is (1) a conspicuous set of spinules arranged in the form of a T on the gastric region—the last in the vertical limb of the T being a distinct spine; and (2) two series of distant spinules on either branchial region.

The rostrum varies somewhat: it is always short, and typically, consists of two vertically compressed spines which are fused in rather more than half their extent and have the tips slightly divergent: but sometimes the fusion is more extensive, or the tips are broken, and the rostrum then has the form of an emarginate stump. The supra-ocular eave is surmounted by a small sharp tooth anteriorly.

The chelipeds in the adult male are more than half again as long as the carapace and rostrum: the merus is a little enlarged distally, and the palm is inflated and distally enlarged: the fingers, which are half the length of the palm, are slightly separated at the base when clenched.

The chelipeds in the female are only one-fourth longer than the carapace and rostrum, and are the slenderest of all the trunk-legs.

The first pair of ambulatory legs are at least six times the length of the carapace and rostrum, rather more than a third of their extent being formed by the dactylus: the other legs gradually decrease in length to the fourth and last, which are about $2\frac{1}{3}$ times the length of the carapace and rostrum. The joints in all are very slender, cylindrical, and except for a spine at the distal end of the upper border of the merus, quite smooth.

Conspicuous on the sternum of the male is a pair of large teeth, placed between the front legs.

The body and legs are usually covered with an excessively short fine down: the legs are often banded, sometimes very distinctly, with dull red.

Egeria investigatoris, n. sp.

This species closely resembles *Egeria arachnoides*, adult males being compared, but differs in the following particulars:—(1) the carapace is more nearly circular, owing to the greater convexity of the hepatic and pterygostomian regions; (2) the spines on the carapace, although almost the same in arrangement, are markedly larger; (3) the sternum has a transverse group of spines on every segment; (4) every abdominal tergum except the last has a large median spine; (5) the hiatus between the post-ocular tooth and the basal antennal joint is scarcely affected by a small denticle; (6) the chelipeds in the adult male are $2\frac{1}{3}$ times the length of the carapace, and have the palm long, very slender, and cylindrical, and the fingers sharply and evenly denticulated all along their apposable edge.

The legs are in fragments, but the joints that remain are extremely long and slender.

Length of carapace and rostrum	...	$24 + 5 = 29$	millim.
Breadth of carapace	...	24	„
Length of male chelipeds	...	65.5	„

Loc. Off Ceylon, 32 fathoms.

DOCLEA, Leach.

Doclea, Leach, Zool. Miscell., Vol. II. p. 41.

Doclea, Milne-Edwards, Hist. Nat. Crust. I. 292.

Doclea, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 652.

Body and appendages tomentose, usually very densely so.

Carapace circular, armed at the sides, and often on the dorsal surface also, with a few spines.

The rostrum consists of two vertically compressed spines which are fused together in almost the whole of their extent and are usually short: it has hence, usually, the appearance of a short flat emarginate beak, hardly breaking the general outline of the carapace. (In one species—*Doclea tetraptera*—the rostrum is rather long).

The eyes are very small, and the commencing orbits are formed by an acute post-ocular tooth and a little-prominent supra-ocular eave. The antennæ are very short and inconspicuous—not reaching to the end of the short rostrum: the basal joint is short, broadly triangular, the apex forming a sharp tooth: the flagella are almost rudimentary.

The buccal frame is somewhat arched in front. The external maxillipeds have the merus rather broader than the ischium, the antero-external angle being slightly produced.

The chelipeds are short and slender in the female; longer, stout, with an enlarged and inflated palm, in the adult male.

The abdomen consists of seven segments in the male, and of seven in the female of all except *D. muricata* and *hybrida*.

Key to the Indian species of Doclea.

- | | | | | |
|--|---|---|---|---|
| I. Pterygostomian regions distinctly canaliculated fore and aft. | { | 1. Rostrum elongate—one-fourth to two-fifths the length of the carapace proper, and with the points very widely divaricated: the last lateral and the median posterior spines of huge size..... | <i>D. tetraptera.</i> | |
| | | { i. Two lateral spines on the branchial region: no median posterior spine.... | <i>D. ovis.</i> | |
| | | { ii. Three lateral spines on the branchial region, the last being short: a short median posterior spine: no spines on the dorsum of the carapace..... | <i>D. japonica.</i> | |
| | | { iii. Three lateral spines on the branchial region, the last being, like the postero-median spine, long: a line of tubercles, two of which are usually produced to form spines, down the middle of the carapace..... | <i>D. canalifera.</i> | |
| II. Pterygostomian regions not canaliculated. | { | 1. Carapace discoid: 2nd pair of trunk-legs three to four times the length of the carapace: a single series of tubercles or spines down the middle of the carapace.... | <i>D. gracilipes.</i> | |
| | | 2. Carapace globular: 2nd pair of trunk-legs hardly twice the length of the carapace: a short series of tubercles or spines on either branchial region parallel to a long mid-dorsal series of tubercles or spines | { i. Tubercles, not spines on the carapace.....

ii. Spines not tubercles, on the carapace..... | <i>D. hybrida.</i>

<i>D. muricata.</i> |

Doclea ovis (Herbst), Edw.

Cancer ovis, Herbst, Krabben, I. ii. 210, tab. xiii. fig. 82; and Fabricius, Syst. Ent. II. 459.

Inachus ovis, Fabricius, Supplement, p. 355.

[*Maia ovis*, Bosc. I. 256]; and Latreille, Hist. Nat. Crust. VI. 100.

Doclea ovis, Milne-Edwards, Hist. Nat. Crust. I. 294.

Doclea ovis, Cuvier, Règne Animal, Crust., pl. xxxiii. fig. 2.

Doclea ovis, Adams and White, Zool. 'Samarang,' Crust., p. 7.

Doclea ovis, A. O. Walker, Journ. Linn. Soc., Zool., XX. 1890, p. 109.

Body and appendages, except the hands and the tips of the dactyli, covered with an extremely dense soft fur.

Beneath the fur the carapace is almost smooth, its surface being hardly broken by a median line of pimples on the gastric region; but its antero-lateral border, on each side, is armed with four sharp teeth of about equal size—one at the angle of the buccal frame; one, which has sometimes a tubercle at its base, on the sub-hepatic region; and two on the front part of the branchial region. The basal antennal joint has also the form of a tooth, and midway between it and the tooth at the outer angle of the buccal frame is another tooth. So that, including the pointed basal antennal joint, the antero-lateral margin of the carapace shows six teeth: there is no spine, though occasionally a trace of a tubercle, on the posterior border.

The rostrum hardly breaks the general subcircular outline of the carapace: it is cleft at the tip, and, measured at the level of the base of the post-ocular tooth, is broader than long.

The pterygostomian region is longitudinally grooved. The chelipeds in the old male are $1\frac{1}{4}$ times the length of the carapace and rostrum, and are enlarged, especially as to the palm, which is $\frac{3}{4}$ as broad as long, and is inflated on the inner side: the fingers also are stout and meet only in (about) the distal third. In the female the chelipeds are only about $\frac{3}{4}$ the length of the carapace and rostrum, and are throughout slenderer than the other legs. The 2nd pair of trunk-legs (first ambulatory legs) are from twice to $2\frac{1}{4}$ times the length of the carapace and rostrum.

The abdomen in both sexes consists of seven distinct segments, and the second segment in the female bears a large median elevation.

A common species in muddy waters in the vicinity of the mouths of the large rivers of India.

Doclea japonica, Ortmann.

Doclea japonica, Ortmann, Zool. Jahrb. Syst., &c., VII. 1893, p. 46, pl. iii. fig. 4.

The only differences between this species and *Doclea ovis* are (1)

that, instead of only two spines on the lateral border of the branchial region, there are *three*, the last being the largest and being placed rather higher up, (so that, including the tooth-like basal antennal joint, there are seven points on the antero-lateral border of the carapace); and (2) that there is a coarse spine, or blunt tooth, on the posterior border of the carapace.

I do not think that these differences are of more than varietal value; for it is not uncommon in *Doclea ovis*, after careful denudation, to find traces of tubercles corresponding to the additional spines of *D. japonica*.

In the Museum collection are specimens from the mouth of the R. Hooghly.

Doclea canalifera, Stimpson.

Doclea canalifera, Stimpson, Proc. Acad. Nat. Sci., Philad., 1857, p. 217.

Body and appendages, except the fingers and dactylopodites, covered with a dense velvet-like tomentum. Carapace subcircular with a line of tubercles or spines down the middle line, namely, some minute tubercles (only visible on the denuded carapace), followed by a spine, on the gastric region; a larger spine on the cardiac region; and a much larger one still on the posterior border: the antero-lateral border is armed with four spines, the first bounding the outer edge of the pterygostomian canal, the last, which is rather larger than the spine of the posterior border, standing near the middle of the branchiostegal border: in addition, there is a small spine at the outer angle of the buccal frame, but no spine between this and the basal antennal joint; and there is a line of extremely faint tubercles, only visible after complete denudation, stretching obliquely on either side from near the front towards the last epibranchial spine.

The rostrum, which is hardly longer than the breadth between the eyes, is sharply and deeply bifid at tip.

The pterygostomian region is longitudinally grooved. The chelipeds (in the young male) are slenderer than the next pair of legs, and are equal to the length of the carapace between the base of the rostrum and the base of the spine on the posterior border. The second pair of trunk-legs, which are the longest, are a little less than twice the length of the carapace and rostrum.

Abdomen of the male seven-jointed.

In the Museum are specimens from the mouth of the Hooghly and from the muddy estuarine coasts of Orissa and of Arakan.

Doclea gracilipes, Stimpson.

Doclea gracilipes, Stimpson, Proc. Ac. Nat. Sci., Philad., 1857, p. 216.

Doclea sp. De Man, Mergui Crust., Journ. Linn. Soc., Zool., XXII. 1888, p. 13.

Doclea andersoni, De Man, op. cit., tom. cit., p. 11, pl. i. fig. 1.

Carapace discoidal, covered, as are also the legs as far only as the end of their merus or carpus, with a short close fur.

Rostrum, measured from the posterior orbital border, sometimes as long as broad and about one-seventh the length of the carapace, sometimes twice as long as broad and about one-fourth the length of the carapace; deeply cleft, the spines sometimes convergent, sometimes almost in contact throughout, sometimes slightly divergent.

Besides a line of four teeth, situated one at the end of the basal antennal joint, one at the angle of the buccal frame, and one behind each of these, the antero-lateral margin is armed with four acute curved claw-like spines, the posterior of which is typically two-fifths to one-third the breadth of the carapace in length, but may sometimes be only one-eighth the breadth of the carapace in length; while the three anterior are typically about one-sixth the breadth of the carapace in length, but may sometimes be merely tubercles.

In the middle of the posterior border is a great spine as large as the last spine of the antero-lateral series.

In the middle line of the carapace is a series of tubercles and spines which are very variable in size: typically only two are prominent, and these have the form of upstanding spines, one in the gastric region, the other—much larger—in the cardiac region. Both of them, however, may be reduced to tubercles, while in front of them and also between them there may or may not be a line of tubercles.

Except for this median line of elevations, the dorsum of the denuded carapace is either smooth, or has only a line of extremely indistinct elevations passing on either side obliquely from near the front towards the great lateral epibranchial spine.

The chelipeds in the female are rather shorter than the carapace: in the male they are rather longer than the carapace, and in the adult male have the palms swollen.

The 2nd pair of trunk-legs are between three and four times the length of the carapace measured from the base of the rostrum to the base of the great median posterior spine.

The two spines on the sternum between the bases of the second pair of legs may be distinct or indistinct.

The abdomen consists of seven distinct segments in both sexes.

In this variable species the constant characters are :—

- (1) the discoid (*i.e.*, non-globose) carapace, with elevations only down the middle line:
- (2) the long slender legs of the second pair.
- (3) the large size of the spine at the external angle of the buccal frame.

In the Museum collection are specimens from the Sandheads, R. Hughli; Mergui; Andamans; and also from Hong Kong, whence the species was originally described by Stimpson.

Doclea muricata (Herbst), Edw.

Cancer muricatus, Herbst, Krabben, I. ii. 211, tab. xiv. fig. 83; and Fabricius, Ent. Syst. II. 459.

Inachus muricatus, Fabricius, Supplement, p. 355.

[*Maia muricata*, Bosc, I. 255.]

Doclea muricata, Milne-Edwards, Hist. Nat. Crust. I. 295.

Doclea muricata, Adams & White, 'Samarang' Crustacea, p. 8.

Doclea muricata, E. Nauck, Zeits. Wiss. Zool., XXXIV. 1880, p. 38, (gastric teeth).

Doclea muricata, C. W. S. Aurivillius, Kongl. Sv. Vet. Akad. Handl., XXIII. 1888-89, No. 4, p. 43, pl. iv. fig. 5.

Doclea muricata, A. O. Walker, Journ. Linn. Soc., Zool., XX. 1890, p. 109.

Doclea muricata, Henderson, Trans. Linn. Soc., Zool. (2) V. 1893, p. 342.

Body and legs, except the hands and dactyli, closely covered with crisp very short velvet.

Carapace subglobular. Rostrum short, distinctly bifid. Besides the spine formed by the basal antennal joint, and two denticles at the outer angle of the buccal frame, the antero-lateral margin is armed with four spines, the last of which, situated near the middle of the branchiostegal border, is considerably the largest. The carapace is traversed fore and aft in the middle line by a row of sharp spines, the last of which, situated on the posterior border, is considerably the largest. Between the median and lateral rows of spines, on the branchial region on either side, are two large spines, one behind the other. There are thus five series of spines upon the carapace, which is otherwise characterized by the distinct delimitation of its regions, and by a sort of festooning of the border between the median and lateral series of regions.

The chelipeds are slender throughout in both sexes, and are hardly equal in length to the carapace measured from the base of the rostrum to the base of the posterior spine: the second pair of trunk-legs are rather more than twice the length of the chelipeds.

The abdomen consists of seven distinct segments in the male; and of four in the female, the 3rd to the 6th being fused.

Of 24 specimens from different parts of India there is not one of great size, nor a single adult female.

I believe that this species is only the young form of *Doclea hybrida*.

Doclea hybrida (Fabr.), Edw.

Inachus hybridus, Fabricius, Supplement, p. 355.

[*Maia hybrida*, Bosc, I. 256]; and Latreille, Hist. Nat. Crust., VI. 99.

Doclea hybrida, Milne-Edwards, Hist. Nat. Crust, I. 294.

Doclea hybrida, Adams and White, 'Samarang' Crustacea, p. 7.

Doclea hybrida, Bleeker, Recherches Crust. Ind. Archipel., p. 9.

Doclea hybrida, De Man, Mergui Crust., Journ. Linn. Soc., Zool., XXII. 1888, p. 9.

Doclea hybrida, Henderson, Trans. Linn. Soc., Zool. (2) V. 1893, p. 342.

? *Doclea hybridoides*, Bleeker, Recherches Crust. Ind. Archipel., p. 8.

This species differs from *Doclea muricata*, only in the following characters, which, I think, are merely due to age:—

(1) it is much larger;

(2) the spine of the antero-lateral series is (except in small females) the smallest, and tubercles are found instead of spines on the dorsal surface of the carapace, the tubercles corresponding in number and position with the spines of *D. muricata*;

(3) the chelipeds in the adult male are nearly as long as the carapace and rostrum, and have the hands enlarged.

As in *D. muricata* the female abdomen consists of four segments.

As Fabricius, *loc. cit.*, says of this species compared with *D. muricata*, *vix distinctus videtur*.

We have 29 good specimens from different parts of India, all being large males and egg-laden females. I think that they can only be the adult stage of *Doclea muricata*.

Doclea tetraptera, A. O. Walker.

Doclea tetraptera, A. O. Walker, Journ. Linn. Soc., Zool., Vol. XX. 1890, p. 114 pl. vi. figs. 4–8.

Body and legs, except the hands and dactyli, covered with a dense stiff fur, so stiff on the trunk-legs as to give their joints, though cylindrical, a sharply quadrangular or triangular sectional form.

The circular form of the carapace is a good deal obscured by the unusual development of the rostrum and of the lateral-epibranchial and postero-median spines.

The rostrum is from one-fourth to two-fifths the length of the carapace proper, and ends in two widely divaricated spinules.

In addition to the tooth formed by the basal antennal joint, and

to a stout tooth at the angle of the buccal frame, the antero-lateral margin bears four large spines: of these, one, situated on the pterygostomian region, is turned downwards to assist in forming a pterygostomian canal somewhat similar to that of *Doclea canalifera*, etc.: of the other three, which are situated on the branchiostegal region, the last is by far the longest and stoutest—being from one-third to half the length of the carapace—and is directed a little backwards and upwards. Down the middle line of the carapace runs a row of spines, increasing in size from before backwards to the last, which, situated on the posterior border, consists of two branches, one branch directed vertically upwards, the other directed horizontally backwards, the horizontal branch being often half the length of the carapace proper.

On the anterior part of the branchial region, midway between the middle line and the lateral border of the carapace, is a stout spine, visible without any denudation.

The chelipeds in the adult male are equal in length to the carapace and rostrum, and have the hands much broadened, inflated, and very elegantly carinated along the lower border, and the fingers evenly denticulated but not closely apposable in all their extent. In the female the chelipeds are not much more than half as long as the carapace *plus* rostrum and posterior spine, and are rather slenderer than the other legs, the fingers also being closely apposable throughout. In young males, of the size figured by Mr. Walker, the enlargement of the hands is much less marked than in old males.

The second pair of trunk-legs, which are the longest, are from twice to $2\frac{1}{2}$ times the length of the carapace measured from the base of the rostrum to the base of the great postero-median spine.

The sternum in the male has a pair of sharp teeth on its first segment.

The abdomen in both sexes consists of seven separate joints.

Colours in life: dull chocolate, spines white-tipped, chelipeds ivory tinged with pink, legs brownish pink with bright red dactyli.

This species, of which we have a very fine old male, two younger males of different sizes, an adult female, and a young female, appears to be extremely close to *D. calcitraba*, White (Proc. Zool. Soc., 1847, p. 56; Ann. Mag. Nat. Hist., Vol. XX. 1847, p. 61; and 'Samarang' Crustacea, p. 7, pl. i. fig. 2). It appears to differ from *D. calcitraba* only in the proportions of the legs, which are slender and very long in the last-named species.

It may be mentioned that the rostrum and great spines of the carapace are, judging from the state of two of our specimens, liable to be broken and only very imperfectly repaired again.

Our specimens all came from the vicinity of the mouth of the River Hooghly.

Alliance II. LISSOIDA.

HOPLOPHRYS, Henderson.

Hoplophrys, Henderson, Trans. Linn. Soc., Zool., Vol. (2) V. 1893, p. 346.

Carapace subovate (elongate pentagonal), with the regions moderately defined and the surface spinose. The rostrum is composed of two short, flattened, acute, divergent spines. The commencing orbits are formed by a supra-ocular eave which has its antero-external angle very strongly and acutely produced, and which is in close contact with a slightly excavated post-ocular tooth, only a very narrow fissure being left between: below, there is no trace of an orbital floor. The eyes are short, and even when fully retracted the cornea is hardly at all concealed from dorsal view. The basal antennal joint is very acutely triangular, the spinous termination being distinctly visible from above: the very short slender mobile portion of the antenna is exposed. The antero-external angle of the merus of the external maxillipeds forms a foliaceous lobe: the merus therefore is broader than the ischium; the palp is attached to its internal angle. The trunk-legs are strongly spinose: the chelipeds, even in the adult male, are slender, but still differ from those of the female in having the fingers more arched and closely apposable only in the distal half.

The abdomen in the male consists of seven distinct segments; but in the female of only five—the fourth to the sixth being fused together.

Hoplophrys oatesii, Henderson.

Hoplophrys oatesii, Henderson, Trans. Linn. Soc. Zool., 1893, p. 347, pl. xxxvi. figs. 1-4.

The gastric region of the carapace is prominent, with two curved rows of spines, the front row (convex anteriorly) consisting of seven spines of which the middle one is the largest, the back row (slightly convex posteriorly) consisting of three spines of which the middle one—the largest of all the spines on the gastric area—is compressed laterally. On the cardiac area, as well as on the gastric area, are two spines placed side by side. On either branchial area are three spines arranged in a triangle, of which the anterior is the largest of all the spines on the carapace, while the most external, which occupies the lateral epibranchial angle, is the most acute and is also unequally bifid. There are also two or three spinules on the hepatic area. Between the

spines the surface is perfectly smooth and polished, although there are some tufts of stiff clean hairs.

The rostrum, which consists of two very acute and slightly divergent teeth, is about one-fourth the length of the carapace proper.

The supra-ocular eave is produced forwards as a very acute spine, the base of which is surmounted by a secondary spine. The cornea is surmounted by a spinule.

The chelipeds have the merus slightly, and the carpus strongly spiny, and are equal to the carapace (without the rostrum) in length: they are almost alike in the adults of both sexes, the fingers only of the male differing from those of the female in being closely apposable only in the distal half, instead of throughout. The ambulatory legs, which are about equal to the chelipeds and to one another in length, have the merus carpus and propodite spiny, and the dactylus stout, claw-like, and denticulated on part of the posterior margin.

In the Museum collection are an adult male and an egg-laden female taken by myself, off the Ganjam Coast in 15-25 fms., from a colony of *Spongodes*. The *Spongodes* which belongs to a species (I think new) intermediate in character between *S. cervicornis* and *S. pustulosa*, W. and S., is one of those with a brilliant white cœnosarc and pink zooids, so that the crabs with their porcelain-white bodies, pink spines, and pink-banded legs were with difficulty detected.

Dr. Henderson considers the above species to be closely related to *Schizophrys* and *Microphrys*, but it appears to me to be much more closely related to *Pisa* and *Tylocarcinus*.

TYLOCARCINUS, Miers.

Tylocarcinus, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 664. (*Pisa*, Latr. part.; *Pisa*, Edw. part.; *Milnia*, Stimpson part.; *Microphrys*, Edw. part.)

Carapace tuberculated, pyriform, without lateral spines. The rostrum consists of two slender slightly divergent spines.

The eye-stalks are short and are retractile, but not to such an extent as to completely conceal the cornea. The commencing orbits are formed by a supra-orbital eave, the anterior angle of which is produced forwards as a spine roughly parallel with the rostrum, and of a strongly cupped post-ocular process which, instead of being isolated, is in the closest contact above with the supra-ocular eave and below with the basal antennal joint. The basal antennal joint, which is of no great breadth, has its antero-external angle produced to form a sharp tooth, which is not visible from above: the mobile portion of the antenna, which is short, is completely exposed.

The external maxillipeds have the merus as broad as the ischium, and the palp attached to the internal angle of the merus.

The chelipeds in the adult male are somewhat stouter than the other legs, have the palm short and enlarged, and the fingers arched and meeting only at tip: in the female they are slenderer than the other legs, have the palm slender, and the fingers closely apposable throughout. The ambulatory legs are stout, and have the dorsal surface sharply nodose or coarsely spinose.

The abdomen in both sexes consists of seven distinct segments.

This genus, which appears to me to be but slightly distinct from *Pisa* (e.g., *Pisa corallina*), Riss., shows the transition towards *Tiarinia* in the next group.

That it should be grouped with *Tiarinia* and *Macrocoeloma*, as it is by Miers (*loc. cit.*), I cannot agree, since *Tiarinia* has complete orbits and an enormously broad basal antennal joint, which *Tylocarcinus* has not.

The type of *Tylocarcinus*, namely *T. styx* (Herbst) = *Microphrys styx* A. Milne-Edwards, is placed by the latter author (*Nouv. Archiv. du Mus.*, VIII. 1872, p. 247) between *Picrocerus* and *Criocarcinus* on the one hand and *Hyastenus* on the other; and this seems to me to be a very natural position.

Tylocarcinus styx (Herbst).

Cancer styx, Herbst, Krabben, III. iii. 53, pl. viii. fig. 6 ("nur klein").

[*Pisa styx*, Latr. Encyc., X. 141.]

Pisa styx, Milne-Edwards, Hist. Nat. Crust. I. 308.

Arctopsis styx, Adams and White, 'Samarang' Crust, p. 10; and A. Milne-Edwards, in Maillard's L'île Reunion, Annexe F, p. 6.

Milnia styx, Stimpson, Ann. Lyc. Nat. Hist. New York, Vol. VII. 1862, p. 180.

Microphrys styx, A. Milne-Edwards in Archiv. du Mus. VIII. 1872, p. 247, pl. xi. fig. 4.

Tylocarcinus styx, Miers, Ann. Mag. Nat. Hist. 1879, Vol. IV. p. 14.

Pisa styx, Richters, Möbius, Meeresf. Maurit., p. 141.

Tylocarcinus styx, de Man, Notes Leyden Mus., Vol. III. 1881, p. 94; and Archiv. fur Naturges. LIII. 1887, p. 228; and Ortmann, Zool. Jahrb. Syst. etc. VII. 1893, p. 62; and Henderson, Trans. Linn. Soc., Zool., 1893, p. 349.

Carapace subpyriform and covered with rounded tubercles, among which the following are distinct:—two in the inter-orbital space; four in a transverse series on the front part of the gastric region, followed by three in a triangle; one in the groove between the gastric and cardiac regions, and three in a triangle on the latter region; two, side by side, on the intestinal region; and three on the posterior margin. Besides these there are several on either hepatic region, and many on the branchial regions.

The rostrum, which is between one-third and one-fourth the length of the carapace proper, consists of two divergent spines fused together at the base and slightly incurved towards the tip. The anterior angle of the supra-ocular eave is produced forwards as a sharp spine.

The chelipeds in the adult male are equal to the length of the carapace behind the bifurcation of the rostral spines: they are hardly stouter than the other legs, except as to the palm, which is short and inflated: the fingers, which are three-fourths the length of the palm, are strongly arched, and meet only at the tip.

In the female the chelipeds are not quite as long as the post-orbital portion of the carapace, are slenderer than the other legs, and have the palm slender and the fingers closely apposable throughout.

The ambulatory legs are short and stout: the first pair, which are considerably the longest, are rather longer than the carapace and rostrum: the merus and carpus in all are nodose on the dorsal surface, and the dactyli are strong and claw-like: always in the first pair, and sometimes in the succeeding pairs, the merus has a row of coarse spines along its front margin, and the carpus a single stout spine.

Herbst's figure is either a young male, or, more probably, a female. The figure given by A. Milne-Edwards (*loc. cit.*) is very correct; but I do not see how Miers, who cites this figure with affirmation, can call the chelipeds in the male slender: they are, like the other legs, stout, and the hands are distinctly massive.

In the Museum collection are specimens from Ceylon, from the Andamans, and from Mergui; as well as an adult male and female from Samoa obtained from the Museum Godeffroy.

Sub-family IV. MAIINÆ.

Eyes either (1) with orbits, which are either incomplete or complete, but are always complete enough to entirely conceal the cornea, when fully retracted, from dorsal view; or (2) but partially protected by a huge horn-like or antler-like supra-ocular spine, or by a large jagged post-ocular tooth, or by both.

The orbit in the first case is formed in one of two ways: there is always an arched supra-ocular eave, and a prominent post-ocular spine; and either the interval between the eave and the spine is filled by an intermediate spine which completes the orbital roof; or the supra-ocular eave and the post-ocular process are in close contact with one another, and with a process of the basal antennal joint below, so as to more or less complete the floor also of the orbit.

The basal antennal joint is always very broad, and either has its outer angle produced to aid in forming the floor of the orbit, or is armed distally with one or two large spines.

The external maxillipeds have the merus as wide as or much wider than the ischium, and the palp inserted at the antero-internal angle of the merus.

The rostrum is formed of two spines, which may be horizontal, semi-deflexed, or completely deflexed; in the last case the spines are usually more or less fused together.

The ambulatory legs are of no great length.

Key to the Indian genera.

Alliance 1. MAIOPID-
A.—Carapace
either regularly
pyriform or sub-
circular: rostral
spines horizontal:
orbits incomplete
below; but fairly
well roofed in
above (1) by a su-
pra-ocular eave,
which has at least
its postero-exter-
nal angle pro-
duced, (2) by a
post-ocular spine,
and (3) by a spine
intercalated
between (1) and
(2).

1. Supra-ocular
eave and interme-
diate spine very
prominent: eye-
stalks slender and
curved, with the
cornea elongate
and occupying a
position more ven-
tral than terminal.

i. The antennular
flagellum springs,
or appears to
spring, from with-
in the orbit.....

ii. The antennular
flagellum arises
quite clear of the
orbit.....

MAIA.

PARAMITHRAX.
[CHLORINOIDES.]

2. Supra-ocular
eave and interme-
diate spine dis-
tinct, but not very
prominent: eye-
stalks stout, with
rounded corneæ
which occupy a
position as much
terminal as ven-
tral.

i. Carapace pyri-
form: rostral
spines of consider-
able length, and
with one or more
accessory spines
on the outer sur-
face.....

ii. Carapace subcir-
cular: rostral
spines simple, and
so short as to
hardly break the
general outline of
the carapace.....

SCHIZOPHRYS.

CYCLAX.

Alliance 2. STENOCIONOPOIDA.
—Carapace pyriform, often
broadened anteriorly: the
orbits either have the form
of long semitubular antlers
which sheathe the eye-stalk,
but do not protect the eye,
the cornea in retraction being
protected by the base of an
extremely long and promi-
nent, isolated, post-ocular
horn; or are reduced to the
form of long outstanding
horns similar to those of the
rostrum: eye-stalks extreme-
ly long: the external maxilli-
peds have the external angle
much produced: the rostrum
consists of two long horns.

1. Orbits in the form of huge
semi-tubular antlers followed
by a long isolated post-ocular
tooth: rostrum vertically
deflexed: buccal frame much
broader in front than behind.

2. Orbits in the form of long
outstanding horns similar to
those of the rostrum, which
is not deflexed, buccal frame
quadrangular.....

CRIOCARCINUS.

STENOCIONOPS.

Alliance 3. PERICEROIDA. — Carapace usually broadened anteriorly by the outstanding orbits: the orbits are either nearly or quite complete above and below, being formed by a strongly-arched supra-ocular eave in close contact with an excavated post-ocular lobe, a process of the basal antennal joint filling in the floor below.	1. Carapace oblong: rostrum broadly laminar, vertically or nearly vertically deflexed: orbits complete, but shallow..	MICIPPA.
	2. Carapace subcylindrical, the rostrum along with the front part of the gastric region vertically deflexed.....	CYPHOCARCINUS.
	3. Carapace more or less pyriform: rostral spines distinct from the base, horizontal or slightly deflexed: orbits in the form of outstanding tubes which completely ensheath the eyes.	{ i. Rostral spines divergent.. MACROCOELOMA. { ii. Rostral spines parallel and closely approximated throughout their extent..... TIARINIA.

Alliance I. MAIOIDA.

MAIA (Lamk.) Edw.

[*Maia*, Lamarck, Syst. Anim. sans verteb. V. 154 (*partim*).]

Maia, Latreille, Hist. Nat. Crust. VI. 87 (*partim*).

Maia, Desmarest, Consid. Gen. Crust., p. 143.

Maia, Milne-Edwards, Hist. Nat. Crust., I. 325.

Maia, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 655.

Carapace pyriform, with the regions indistinct, the surface closely granular or spinular, and the lateral borders usually armed with large spines. The rostrum consists of two rather short, straight, divergent spines. The basal joint of the antennæ is broad, and has both the antero-external and antero-internal angle produced to form spines: the mobile portion of the antenna, which appears to spring from within the orbit, is completely exposed. The eye-stalks are long and curved, and bear the cornea chiefly on their ventral surface. The orbit is formed by a prominent supra-ocular eave which has its postero-external angle produced, by a sharp post-ocular spine, and by another spine between these two: the eyes are completely concealed from dorsal view when retracted. The external maxillipeds have the merus as broad as the ischium, the palp being attached to the antero-internal angle of the merus.

The chelipeds are slender, with cylindrical joints and styliform fingers. The ambulatory legs decrease very gradually in length: the first pair are not much longer than the carapace and rostrum: the dactyli of all are styliform.

The abdomen in both sexes consists of seven distinct segments.

Maia spinigera, de H.

Maia spinigera, de Haan, Faun. Japon. Crust., p. 93, pl. xxiv. fig. 4.

Maia spinigera, Adams and White, 'Samarang' Crustacea, p. 15.

Maia spinigera, Dana, U. S. Expl. Exped. Crust., pt. I. p. 85.

Maia spinigera, Ortmann, Zool. Jahrb. Syst. &c., VII. 1893, p. 51.

Carapace armed with long spines along the antero-lateral borders, down the median line, and in an oblique series on either branchial region joining the median to the antero-lateral series. Excluding the pre-ocular and post-ocular spines and the spines between them, there are four large spines on the antero-lateral border: and there are three large spines in an oblique series on either branchial region. In the middle line of the carapace there are in the gastric region two spines, in the anterior cardiac one, in the post-cardiac one, in the intestinal one, and on the posterior border a pair. Between these large spines the surface of the carapace is sharply, finely, and evenly granular.

The rostrum consists of two moderately divergent spines, the length of which is about one-fourth that of the carapace.

The chelipeds are smooth and very slender, and are rather shorter than the 2nd pair of trunk-legs: the latter, which are the longest of all, are about one-sixth longer than the carapace and rostrum. The merus of all the ambulatory legs has a strong spine at the distal end of its upper border: all the joints of all the ambulatory legs are covered with long hairs.

In the Museum collection is a single specimen from the coast of Beluchistán.

Maia gibba, n. sp. Plate IV. fig. 5.

Very near *Maia miersii*, Walker (J. L. S., Zool., Vol. XX. 1890, p. 113, pl. vi. figs. 1-3).

Distinguished (1) by the globose inflation of the posterior (branchiostegal) part of the closely and crisply tubercular carapace, and by the corresponding declivity of the anterior part, giving the animal a hunch-backed appearance; (2) by the absence of *large* marginal spines on the carapace.

Carapace remarkably swollen in its posterior part, where its greatest breadth is from about three-fourths (♂) to seven-eighths (♀) its extreme length with the rostrum; and closely covered with sharp piliferous tubercles, which, in the male, but hardly in the female, become spinular in the middle line and along the lateral borders.

The rostrum, which, like the anterior part of the carapace, is somewhat declivous, ends in two acute divergent hairy spines, which in the

male are about one-sixth, in the female about one-eighth, the rest of the carapace in length. The eyes and orbits are just as in *M. squinado* (with specimens of which this species has been compared), only the cornea is relatively very much larger, and almost entirely ventral, in the present species, and the spine between the spine of the pre-orbital-hood and the post-orbital spine is nearly as large as either of these.

The antennæ are in all respects as in *M. squinado*, except that the basal joint is slightly narrower.

The appendages are just as in *M. squinado*—the legs being short and hairy and the chelipeds smooth and polished—with the single difference that the chelipeds are only as long as, and are much slenderer than the *fifth* pair of legs, and are therefore very much shorter than the second pair, which hardly exceed the carapace and rostrum in length.

			Male.	Female.
Length of carapace	...	...	32 millim.	41 millim.
Greatest breadth of carapace	...	...	25 „	35 „
Length of chelipeds	...	...	24 „	31 „
„ „ 2nd pair of trunk-limbs	...	...	33·5 „	46 „

Loc. Andaman Sea, 250 fms.

PARAMITHRAX, Edw.

Paramithrax, Milne-Edwards, Hist. Nat. Crust. I. 323.

Paramithrax (*Paramithrax* et *Leptomithrax*), Miers, Journ. Linn. Soc. Zool., Vol. XIV. 1879, pp. 655 and 656.

Acanthophrys (partim), A. Milne-Edwards, Ann. Soc. Ent. Fr. (4) V. 1865. p. 140.

Chlorinoides, Haswell *infra*; and Miers *infra*.

Sub-genus CHLORINOIDES, Haswell.

Chlorinoides, Haswell, P. L. S., N. S. Wales, Vol. IV. 1879, p. 442; and Ann. Mag. Nat. Hist., Vol. V. 1880, p. 146; and Cat. Austral. Crust., p. 17.

Chlorinoides, Miers, 'Challenger' Brachyura, p. 51.

Carapace pyriform, convex, with the regions indistinct; armed with some very large acute spines. The rostrum consists of two long slender divergent horns. The basal antennal joint is just as in *Maia*, but the mobile portion of the antenna has no connexion with the orbit. The eyes and orbits are as in *Maia*, but the supra-ocular hood has its anterior angle as well as its posterior angle produced into a spine. The external maxillipeds are as in *Maia*, as are also the ambulatory

legs. The chelipeds however differ, at any rate in the male, in which sex they are stouter than any of the other legs, have the palms enlarged, and the fingers arched and meeting only at the tips, which are not excavated.

The abdomen in both sexes consists of seven distinct segments.

As Miers has pointed out ('Challenger' Brachyura, p. 52), *Chlorinoides* may be regarded as a sub-genus of *Paramithrax*, and is also closely connected with *Acanthophrys aculeatus* A. Milne-Edwards (Ann. Soc. Ent. Franc. (4) V. 1865, p. 140, pl. iv. fig. 4). According to Miers, with whom I entirely agree, if *Acanthophrys aculeatus* is the type of the genus *Acanthophrys*, then *Chlorinoides* is synonymous with *Acanthophrys*.

Paramithrax (Chlorinoides) aculeatus, (Edw).

Chorinus aculeata, Milne-Edwards, Hist. Nat. Crust. I. 316.

Chorinus aculeatus, Adams and White 'Samarang,' Crust., p. 13.

Paramithrax (Chlorinoides) aculeatus, var. *armatus*, Miers, Zool. H. M. S. 'Alert,' pp. 182 & 193, pl. xviii. fig. A.

Chlorinoides aculeatus, Miers, 'Challenger' Brachyura, p. 53.

Chorinus aculeatus, C. W. S. Aurivillius, Kongl. Sv. Vet. Akad. Handl., Bd. XXIII. No. 4, p. 38, pl. ii. fig. 7.

Chlorinoides aculeatus, Henderson, Trans. Linn. Soc., Zool., 1893, p. 345.

Carapace pyriform, convex, smooth, armed with five huge thorn-like spines down the middle line, and with two even larger spines on the branchial region: there are also, on either pterygostomian region, two oblique crests, the anterior with three or four teeth—two of which are visible in a dorsal view—the posterior with one or two.

The rostrum consists of two large divergent horns, the length of which is considerably more than half that of the carapace proper.

The orbit consists of a supra-ocular hood, the angles of which (especially the anterior) are strongly produced, of a bilobed post-ocular tooth, and of a long spine filling the interval between the two, just as in *Maia spinigera*. The basal antennal joint, as in most of the forms included in this group, has a strong spine at its antero-external, and another at its antero-internal angle.

The chelipeds in the female are slender, and are only equal to the post-rostral portion of the carapace in length: as in the male, the merus has its crest-like upper and lower edges sharply scalloped and the carpus is cristate above. In the male the chelipeds are stouter than the other legs, especially as to the palm, which is considerably enlarged. The ambulatory legs decrease gradually in length from the 1st pair, which are equal in length to the carapace *plus* two-thirds of the rostrum: the merus in the first two pairs has a very strong spine at the

distal end of its upper border ; but this in the case of the last two pairs is often reduced to a tubercle.

The body and legs in this species are somewhat hairy and are more or less encrusted with sponges, zoophytes, polyzoa, etc.

In the Museum collection are specimens from the Arakan Coast, Mergui, and Ceylon.

Paramithrax (Chlorinoides) longispinus (de Haan).

Maja (Chorinus) longispina, de Haan, Faun. Japon., Crust., p. 94, pl. xxiii. fig. 2.

Chorinus longispina, Adams and White, 'Samarang' Crust., p. 12.

Paramithrax (Chlorinoides) longispinus, Miers, Zoology H. M. S. 'Alert,' pp. 517 and 522.

Chlorinoides longispinus, Miers, 'Challenger' Brachyura, p. 53.

Chlorinoides longispinus, A. Ortmann, Zool. Jahrb. Syst., etc., VII. 1893, p. 53.

This species differs from *P. aculeatus* in the following constant characters :—

- (1) it is a much smaller species ;
- (2) all the spines, including the rostral spines, are elegantly knobbed at tip ;
- (3) in the median line of spines the third—the one on the cardiac region—is cleft transversely into two from the base ;
- (4) the two oblique dentate ridges on the pterygostomian region are present, but the outermost tooth on the front ridge is produced to form a long spine ;
- (5) the spine at the anterior angle of the supra-ocular hood is similar in size, form, and direction to the other large spines of the carapace ;
- (6) the rostral spines are less than half the length of the carapace ;
- (7) the antero-external angle of the basal antennal joint is produced to form, not a spine, but an elegantly curved foliaceous lobe ;
- (8) the meropodites of all the ambulatory legs have the terminal spine distinct and knobbed at the tip.

This species commonly encrusts itself with a very regular plate-armour of Orbitolites and rounded fragments of Nullipore, etc.

In the Museum collection are good series from off Ceylon 33–34 fathoms, from the Andaman Sea down to 41 fathoms, and from the Madras Coast.

SCHIZOPHRYS, White.

Schizophrys, White, Ann. Mag. Nat. Hist., Vol. II. 1848, p. 282.

Schizophrys, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 660 (*et synonym.*); and 'Challenger' Brachyura, p. 66.

Dione, de Haan, Faun. Japon. Crust., p. 82.

Carapace broadly pyriform, with the surface granular and the lateral margins strongly spinate. The rostrum consists of two short stout slightly incurved spines, the outer border of which carries one or two accessory spines. The orbit is formed by a little-prominent supra-ocular eave, and a sharply bilobed post-ocular tooth, with a broad spine in the interval between the two: the eye-stalks are stout and the cornea terminal, not ventral, in position. The basal antennal joint is somewhat narrowed anteriorly, and ends in two sharp spines—as in the genera immediately preceding: the mobile portion of the antenna is freely exposed. In the external maxillipeds the merus is rather broader than the ischium, and the palp is attached to the antero-internal angle of the merus.

The chelipeds have the merus and carpus granular or spiny; the palm long, smooth and slender; and the fingers longitudinally channelled in their distal half—this being specially marked in the adult male, in which also the chelipeds are longer and stouter than the other legs.

The ambulatory legs are stout, have cylindrical joints, and decrease gradually in length.

The abdomen in both sexes consists of seven distinct segments.

Schizophrys aspera, (Edw.)

Mithrax asper, Milne-Edwards, Hist. Nat. Crust., I. 320; and Dana, U. S. Expl. Exp. Crust., pt. I. p. 97, pl. ii. figs. 4 *a-b*.

Schizophrys aspera, A. Milne-Edwards, Nouv. Archiv. du Mus. VIII. 1872, p. 231, pl. x. fig. 1; and Haswell, Proc. Linn. Soc., N. S. Wales, Vol. IV. 1879, p. 447; and Cat. Austr. Crust., p. 22; and Miers, Zool. H.M.S. 'Alert,' pp. 182 and 197, and 'Challenger' Brachyura, p. 67; and De Man, Archiv. fur Naturgesch., LIII. 1887, p. 226, and Journ. Linn. Soc., Zool., Vol. XXII. 1888, p. 20; and C. W. S. Aurivillius, Kongl. Sv. Vet. Akad., Handl. XXIII. 1888-89, No. 4, p. 51; [and Cano, Boll. Soc. Nat., Napol., III. 1889, p. 179]; and A. O. Walker, Journ. Linn. Soc., Zool., Vol. XX. 1890, pp. 109 and 113; and Ortmann, Zool. Jahrb. Syst., etc., VII. 1893, p. 57; and J. R. Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 346; and Mary J. Rathbun, Proc. U. S. Nat. Mus., Vol. XVI. 1893, p. 91.

Schizophrys serratus, White, P. Z. S., 1847, p. 223, fig.; and Ann. Mag. Nat. Hist., Vol. II. 1848, p. 283, fig.; and Adams and White, 'Samarang' Crust., p. 16.

Schizophrys spiniger, White, *ll. cit.*; and Adams and White *loc. cit.*; and ? Kossmann, Reise Roth. Meer., Crust., p. 15.

Maja (Dione) affinis, de Haan Faun. Japon. Crust., p. 94, pl. xxii. fig. 4; and Adams and White, 'Samarang' Crust., p. 15; and Stimpson, Proc. Ac. Nat. Sci., Philad., 1857, p. 218.

Mithrax spinifrons, A. Milne-Edwards, Ann. Soc. Ent., France, (4) VII. 1867, p. 263.

Mithrax affinis, F. de B. Capello, Journ. Sci., Lisb., 1870-71, p. 264, pl. iii. figs. 4, 4a.

Mithrax (*Schizophrys*) *affinis*, *triangularis* (et varr. *excipe* var. *dichotoma*) Kossmann, Reise Roth. Meer., Crust., pp. 11 and 13; and *Schizophrys triangularis* var. *indica*, Richters, Möbius, Meeresf. Maurít., p. 143, pl. xv. figs. 8-14.

Carapace pyriform, its greatest breadth about $\frac{9}{10}$ its length behind the point of bifurcation of the rostral spines, its surface closely and unevenly granular, with scattered sharp tubercles in addition. Exclusive of the large unequally-bifid post-ocular spine, the antero-lateral border is armed with six equidistant spines, the last of which is the smallest and is situated on a rather higher level than the others: the posterior border proper is generally beaded, and has its angles produced and upturned.

The rostrum consists of two stout parallel or incurved spines, the length of which is from one-fifth to one-sixth that of the carapace proper, and the outer border of each of which carries a strong accessory spine.

The basal antennal joint ends in two stout spines, and there is a spine on the sub-hepatic region outside the angle of the buccal frame, and a sharp denticle in the middle of the inferior border of the orbit.

The chelipeds vary: in both sexes the palm is long—twice the length of the fingers—smooth, polished, and either quite unarmed, or armed, at the near end of the upper border, with a spine or with two or three denticles; and in both sexes the merus and carpus are either spiny or granular.

But whereas in old males the chelipeds are stouter than any of other legs, are more than half again as long as the carapace and rostrum and nearly half again as long as the 2nd pair of legs, and have deeply channelled fingers that meet in less than their distal half; in females and young males they are not stouter than the other legs, are not quite equal in length to the carapace and rostrum or to the second pair of legs, and have the fingers less deeply channelled, and apposable in at least half their extent.

The ambulatory legs decrease very gradually in length: they have short claw-like dactyli, and the merus is armed at the far end of the upper border with a spine or tubercle. The body and legs are hairy, and the animal frequently protects itself with flat pieces of Nullipore, &c.

In the collection is a large series of specimens from all parts of the Indian coast, from Mergui and Tavoy on the East to Karáchi on the West.

Schizophrys dama, (Herbst.)

Cancer dama, Herbst, Krabben, III. iv. p. 5, tab. lix. fig. 5.

Mithrax dama, Milne-Edwards, Hist. Nat. Crust., I. 319.

Mithrax (*Schizophrys*) *dama*, Kossmann, Reise Roth. Meer., Crust., pp. 11 and 13.

This species differs constantly from *Schizophrys aspera* in the following particulars:—

- (1) the carapace is much more elongate, its greatest breadth being only about $\frac{3}{4}$ its length behind the point of bifurcation of the rostral spines;
- (2) the rostrum is rather longer, and has *two* accessory spines on its outer border;
- (3) there is no (ventral) spine on the sub-hepatic region;
- (4) the surface of the carapace is more closely and evenly, but more bluntly, granular.

The specimens in the Museum collection come from the Straits of Malacca.

CYCLAX, Dana.

Cyclax, Dana, U. S. Expl. Exp., Crust., pt. I. p. 99.

Cyclomaia, Stimpson, Amer. Journ. Sci. and Arts, Vol. XXIX. 1860, p. 133; and A. Milne-Edwards, Nouv. Archiv. du Mus., VIII. 1872, p. 235 (*et synonym.*)

Cyclax (*Cyclax* and *Cyclomaia*), Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 660.

This genus differs from *Schizophrys*, from which, perhaps, it ought not to be separated, only in the form of the carapace, and in the gradation and shortening of the rostrum, with which is correlated a shortening and broadening of the basal antennal joint. (In one species the legs are slender). The carapace is subcircular; the rostrum obsolescent and bifid; the basal antennal joint very short and broad, and armed with a third spine—a very small one, situated on the outer margin.

Cyclax (*Cyclomaia*) *suborbicularis*, (Stimpson).

Mithrax suborbicularis, Stimpson, Proc. Ac. Nat. Sci., Philad., 1857, p. 218.

Cyclax spinicinctus, Heller, Crust. Roth. Meer, in SB. Ak., Wien, XLIII. i. 1861, p. 304, tab. i. figs. 7-8: and Richters, in Möbius, Meeresfauna Maurit., p. 144.

Cyclomaia margaritata, A. Milne-Edwards, Nouv. Archiv. du Mus., VIII. 1872, p. 236, pl. x. figs. 2-3; and Haswell, P. L. S., N. S. Wales, Vol. IV. 1879, [p. 441, and Cat. Austral. Crust., p. 21.

Cyclomaia suborbicularis, Ortmann, Zool. Jahrb., Syst., etc., VII. 1893, p. 58.

[*Cyclomaia margaritata*, F. Muller, Verh. Ges., Basel, VIII. p. 473.]

Carapace subcircular, its surface closely beaded, with some larger spinules regularly interspersed: the lateral margin is armed with six

large spines (exclusive of the large curved unequally-bifid post-ocular spine) the first of which is often bifid: close to the posterior margin, in the middle line, is a pair of smaller spines.

The rostrum consists of two triangular teeth, which although broader are not longer than the spines of the lateral margin.

The eyes are of moderate length and are retractile into orbits formed, as in *Schizophrys*, *Maia*, etc., of a supra-ocular eave, a large post-ocular spine, with another spine in the interval between the two: the supra-ocular eave has its angles slightly produced and spiniform.

The broad short basal antennal joint ends in two stout teeth, and has a third denticle on its outer margin.

The chelipeds in the female and young male are slightly more slender than the other legs, and are as long as the carapace or as the 2nd pair of trunk-legs *minus* the dactylus: they have a long slender smooth palm, nearly twice the length of the fingers. The ambulatory legs are hairy, have short claw-like dactyli, and decrease gradually in length.

In the Museum collection are specimens from the Madras coast and from the Andamans.

Alliance II. STENOCIONOPOIDA.

CRIOCARCINUS, Edw.

Criocarcinus, Milne-Edwards, Hist. Nat. Crust., I. 331.

Criocarcinus, Miers, Journ. Linn. Soc., Zool., Vol. XVI. 1879, p. 661.

Carapace shaped and armed much as in *Chlorinoides*, but with the hepatic regions concave as in *Micippe*. The rostrum consists of two curved almost vertically deflexed spines, which are fused together in their basal half. The eye-stalks are slender and of extreme length. The orbit is formed of a semi-tubular branching supra-ocular hood which encloses the eye-stalk, and of a long slender post-ocular spine, against the base of which the eye is retractile: the supra-ocular hoods have the appearance of a pair of antlers. The basal antennal joint is broad, and has a strong spine at either anterior angle: the mobile portion of the antenna is freely exposed.

The buccal frame is narrow behind and broad in front, as in *Micippe*; and the merus of the external maxillipeds is broader than the ischium, and carries the palp at its deeply-notched internal angle.

The chelipeds are shorter, and in the male somewhat stouter but in the female somewhat slenderer, than the other trunk-legs, which again are of no great length and decrease gradually from the 2nd pair.

The abdomen consists of seven distinct segments in the male, of five in the female.

Criocarcinus superciliosus (Herbst), Guérin, Edw.

Seba, III. xviii. 11: Linnæus, Syst. Nat., I. 2, 1047, No. 45.

Cancer superciliosus, Herbst, Krabben, I. ii. 227, tab. xiv. fig. 89.

Criocarcinus superciliosus, Guérin, Voy. Coquille, Zool., Vol. II. Crust., p. 19.

Criocarcinus superciliosus, Milne-Edwards, Hist. Nat. Crust., I. 332.

Criocarcinus superciliosus, A. Milne-Edwards, Nouv. Archiv. du Mus., VIII. 1872, p. 242, pl. xii. fig. 3.

Criocarcinus superciliosus, Kossmann, Reise Roth. Meer., Crust., p. 10, tab. iii. fig. 6 (*vide synonym*).

Carapace pyriform, broadened anteriorly by the antler-like "orbits," with the hepatic regions sunken, and the other regions fairly distinct: in addition to numerous pearly tubercles, which are tufted with curly bristles, the carapace is armed with several large knob-tipped spines, namely two in the middle line on the gastric region, one in the middle line on the posterior border, one on either side near the boundary of the hepatic and branchial regions, and one, directed obliquely backwards, near the middle of either branchial region.

The rostrum consists of two vertically deflexed spines, the bases of which are broadened and fused together, and the points of which are divergent and elegantly curved.

The eyes and orbits have already been described in a general way: the long semi-tubular supra-ocular hood ends in three diverging tines, and the long post-ocular spine has its anterior border armed with two or three denticles.

The external maxillipeds have the outer edge thin and sharp, the outer edge of the ischium being emarginate, and the outer angle of the merus being produced.

The chelipeds are shorter than the other trunk-legs, and are about as long as the carapace behind the level of the post-ocular spine. In the male they are slightly stouter than the other legs, and have the palm a little swollen: in the female they are slenderer than the other legs, and have the palm slender and a little tapering.

Of the ambulatory legs, which are hairy, the first two pairs are slightly the longest, both being rather less than one-third longer than the post-rostral portion of the carapace: the last two pairs are not much shorter.

In the Museum collection are specimens from the Andaman Islands.

STENOCIONOPS, Latr.

[*Stenocionops*, Latreille, R. A., (2) IV. 59.]

Stenocionops, Milne-Edwards, Hist. Nat. Crust., I. 337.

"Carapace narrow, uneven, and armed posteriorly with a large triangular prolongation which covers the base of the abdomen. The

rostrum is formed of two styliform divergent horns. The supra-ocular border is armed with a horn similar to those of the rostrum, but directed more obliquely. The eye-stalks are slender, immobile and extremely salient; their length is half the greatest breadth of the body. The first joint of the antennæ is much longer than broad, the second is slender and is inserted beneath the rostrum.

The epistome is nearly square, and the external maxillipeds have the merus extremely dilated at the antero-external angle, and excavated at the antero-internal angle. The trunk-legs, in the female, are slender and cylindrical: those of the first pair (chelipeds) are hardly stouter and are much shorter than the second, which latter are a little longer than the carapace and rostrum: the others diminish very gradually in length: all the ambulatory legs have sharp, recurved dactyli. The abdomen of the female consists of five segments, the 4th, 5th and 6th segments being fused together." (Edw.)

Stenocionops cervicornis (Herbst).

Cancer cervicornis, Herbst, Krabben, III. iii. 49, pl. lviii. fig. 2.

[*Stenocionops cervicornis*, Guérin, Icon. Regne An., Crust., pl. 8 bis, fig. 3].

Stenocionops cervicornis, Milne-Edwards, Hist. Nat. Crust., I. 338.

Stenocionops cervicornis, Cuvier, Regne Animal, Crust., pl. xxxi. fig. 1.

Stenocionops cervicornis, and ? *curvirostris*, A. Milne-Edwards, Ann. Soc. Ent., France, (4) V. 1865, p. 135 (pl. v. figs. 1-1e.)

Stenocionops cervicornis, E. Martens, Verh. zool. bot. Ges., Wien, XVI. 1866, p. 379.

[*Stenocionops cervicornis*, Cano, Boll. Soc. Nat., Napol., III. 1889, p. 177.]

Stenocionops cervicornis, Henderson, Trans. Linn. Soc., Zool., 1893, p. 343.

"Carapace uneven and tuberculated: rostral and supra-ocular horns slender, very long, and nearly co-equal: two large conical elevations on the sides of either hepatic region: antennæ shorter than the rostrum: chelæ finely toothed and a little incurved: legs smooth." (Edw.)

Alliance III. PERICEROIDA.

MICIPPA, Leach.

Micippa, Leach, Zool. Miscell., III. p. 16.

Micippe, Desmarest, Consid. Gen. Crust., p. 148.

Micippe, Milne-Edwards, Hist. Nat. Crust., I. 329.

Micippa, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 661; Ann. Mag. Nat. Hist., Vol. XV. 1885, p. 3; and 'Challenger' Brachyura, p. 69.

Carapace nearly oblong, depressed, rounded behind, broadened anteriorly, and ending at a broad, lamellar, more or less vertically

deflexed rostrum, the tip of which is cleft or emarginate. The eye-stalks are long, and the corneæ, which are rather ventral than terminal in position, can be completely retracted from dorsal and usually also from ventral view. The orbit is formed by a sharply-arched supra-ocular eave, which is in contact either with an excavated post-ocular spine or with an intercalated spine as in *Maia*, and is partly or entirely completed below and in front by a process of the broad basal antennal joint. The mobile portion of the antenna is completely exposed.

The buccal frame is broadened in front: the merus of the external maxillipeds is broader than the ischium, and has its external angle expanded and its internal angle notched for the insertion of the palp.

The chelipeds in the adult male are as long as or a little longer than the carapace, are a little stouter than the other legs, and have the palm broader than the other joints, and the fingers arched to meet only at the tip. The chelipeds in the female are slenderer than the other legs, are about the same length as the carapace, and have slender palms and almost straight fingers. The ambulatory legs are moderately elongate, subcylindrical, and have the dactyli not much or not at all shorter than the propodites.

Abdomen, in both sexes, seven-jointed.

Key to the Indian species of Micippa.

- I. Rostrum very broad, ending in four sharp lobes or spines
(*i.e.*, each lobe of the rostrum bilobed)..... *M. philyra*.
- II. Rostrum moderately broad, ending in two long sharp lobes
or spines (*i.e.*, each lobe of the rostrum simple), not
inflexed at tip..... *M. thalia*.
- III. Rostrum moderately broad, inflexed at tip; ending in two
insignificant blunt lobes, each of which has a small
tooth at its external angle:—
 1. Three large pearl-like tubercles embedded
in the posterior margin..... *M. margaritifera*.
 2. Two small pearl-like tubercles embedded
in the posterior margin, with a group of
small spinules between them..... *M. margaritifera*
var. *parca*.

Micippa philyra, (Herbst.) Leach.

Cancer philyra, Herbst, Krabben, III. iii. p. 51, pl. lviii. fig. 4.

Micippa philyra, Leach, Zool. Miscell., III. 16; and Desmarest, Consid. Gen. Crust., p. 149, pl. xxii. fig. 2; and Guérin, Icon. R. A., pl. viii bis, fig. 1; and Milne-Edwards, Hist. Nat. Crust., I. 330; and Adams and White, 'Samarang' Crust., p. 15; and A. Milne-Edwards, Nouv. Archiv. du Mus., VIII. 1872, p. 239, pl. xi. fig. 2 and KOSSMANN, REISE ROTH. MEER., CRUST., p. 6 (*ubi synonym.*); and varr. *platipes* and

mascarenica, pl. iii. figs. 2-3; and Richters, Möbius, Meeresfauna, Mauritius, p. 143, pl. xv. figs. 6-7, and var. *latifrons*, p. 142, pl. xv. figs. 1-5; and Lenz and Richters, Abh. senck. Ges. XII. 1881, p. 421; and Miers, Zoology H. M. S. 'Alert,' pp. 182 and 198, and Ann. Mag. Nat. Hist., 1885, Vol. XV. p. 6, and 'Challenger' Brachyura, p. 69; and Ortmann, Zool. Jahrb. Syst., &c., VII. 1893, p. 59; and J. R. Henderson, Trans. Linn. Soc., Zool., 1893, p. 348.

Micippe platipes, Rüppell, Beschreib. und Abbild., 24 Krabben Roth. Meer., Frankfort, 1830, p. 8, tab. i. fig. 4; and Milne-Edwards, Hist. Nat. Crust., I. 333 (*Paramicippe*); and Heller, Crust. Roth. Meer., SB. Ak., Wien, XLIII. 1861, p. 299, tab. i. fig. 2; and De Man, Archiv. fur Naturgesch., LIII. 1887, p. 227 (*Paramicippe*).

Micippe bicarinata, Adams and White, 'Samarang' Crust., p. 16, (sec. Kossmann and Miers).

? *Micippe hirtipes*, Dana, U. S. Expl. Exp., Crust., pt. I. p. 90, pl. i. figs. 4 a-e; and Stimpson, Proc. Ac. Nat. Sci., Philad., 1857, p. 218; and Heller, Reise 'Novara,' Crust., p. 3.

Micippa spatulifrons, A. Milne-Edwards, Nouv. Archiv. du Mus., VIII. 1872, p. 240, pl. xi. fig. 3; and Haswell, Proc. Linn. Soc., N. S. Wales, Vol. IV. 1879, p. 445, and Cat. Austral. Crust., p. 24.

Micippa mascarenica, Kossm., Miers, Ann. Mag. Nat. Hist., 1885, Vol. XV. p. 7, and 'Challenger' Brachyura, p. 69; and A. O. Walker, Journ. Linn. Soc., Zool., Vol. XX. 1890, p. 109; and J. R. Henderson, Trans. Linn. Soc., Zool., 1893, p. 348.

Micippa superciliosa, Haswell, Proc. Linn. Soc., N. S. Wales, Vol. IV. 1879, p. 446, pl. xxvi. fig. 2, and Cat. Austral. Crust., p. 25.

Paramicippa asperimanus, Miers, Zoology H. M. S. 'Alert,' pp. 517 and 525.

Body and ambulatory legs closely covered by a woolly tomentum. Carapace with the regions well defined by smooth sulci, the hepatic regions sunken and pinched in, the surface closely and unevenly granular: the lateral margins are armed with knob-tipped spinules, of which there are sometimes as many as six, sometimes as few as two, on either side.

The rostrum consists of a broad lamina which in the female is quite vertically, but in males is not so much deflexed, its sides are gently sinuous, and it ends in four sharp-cut lobes. The eyes are completely retractile within the orbits.

The basal antennal joint is short and is extremely broad anteriorly, its greatly produced antero-external angle completing the orbit below and in front. The mobile portion of the antenna, which is freely exposed, varies in length and in the form of the flattened 2nd joint of the peduncle. In some males (var. *mascarenica*) the mobile portion of the antenna is half the length of the horizontal portion of the carapace, and the length of the 2nd joint is rather more than one-third the breadth of the rostrum at its own point of origin. But in all ovigerous females, and in certain males, the mobile portion of the antenna is between one-third and one-fourth the length of the hori-

zontal portion of the carapace, and the length of the 2nd joint is less than one-third the breadth of the rostrum at its own point of origin — the joint also being somewhat broadened.

The chelipeds also vary. In certain males, both adult and young (var. *mascarenica* partim), they are stouter than the other legs, are very variably granular, are a little longer than the carapace, have the hand very variably broadened and inflated, and the fingers closely apposable only at tip.

In all females they are a little shorter than the carapace, are quite smooth, are rather slenderer than the other legs, and have slender palms, and fingers that are closely apposable in the greater part of their extent.

In certain other adult males they are intermediate in condition, approaching more to the female type.

The ambulatory legs are moderately stout and are hairy: the 1st pair, which are the longest, are rather longer than the chelipeds; the others decrease gradually in length.

Miers' valuable paper, *Ann. Mag. Nat. Hist.*, 1885, Vol. XV. pp. 6–8 should be consulted. After examining over forty specimens from the Andamans I adhere to Kossmann's synonymy and opinion (*loc. cit.*)

The characters upon which the separation of *M. mascarenica* from *M. phillyra* is based are all variable; and I think that we have here to deal with a case of male dimorphism, such as is known to occur in certain Beetles, where one form of male is aberrant from the female type while another form of male resembles the female in certain particulars: *vide* Bateson and Brindley, *Variation in Secondary Sexual Characters*, P.Z.S., 1892, p. 585.

Micippa thalia, Herbst.

Cancer thalia, Herbst, *Krabben*, III. iii. 50, tab. lviii. fig. 3.

Micippa thalia, Gerstäcker, *Archiv. fur Naturgesch.*, XXII. 1856, p. 109; and Adams and White, 'Samarang' *Crust.*, p. 15; and A. Milne-Edwards, *Nouv. Archiv. du Mus.*, VIII. 1872, p. 238, pl. xi. fig. 1; and Kossmann, *Reise Roth. Meer.*, *Crust.*, p. 8 (*et varr.*); and MIERS, *Zoology H. M. S. 'Alert'*, pp. 182 & 198, and *ANN. MAG. NAT. HIST.*, 1885, Vol. XV. p. 10 (*ubi synonym.*), and 'Challenger' *Brachyura*, p. 70; and [Cano., *Boll. Soc. Nat., Napol.*, III. 1889, p. 179]; and Ortmann, *Zool. Jahrb. Syst.*, etc., VII. 1893, p. 60; and Henderson, *Trans. Linn. Soc., Zool.*, 1893, p. 348.

Micippa thalia (= var. *aculeata*), de Haan, *Faun. Japon. Crust.*, p. 98, pl. xxiii. fig. 3; and Krauss, *Südafr. Crust.*, p. 51; and Bianconi, *Mem. Ac., Bologna*, III., 1851, p. 103, pl. x. fig. 2; and Kossmann, *Reise Roth. Meer.*, *Crust.*, pp. 5 and 8, pl. iii. fig. 5; and Hilgendorf, *MB. Akad., Berl.*, 1878, p. 786; and Richters, *Möbius, Meeresfauna, Maurit.*, p. 142; and Miers, *Ann. Mag. Nat. Hist.*, 1885, Vol. XV. p. 11 (*ubi synonym.*); and De Man, *Journ. Linn. Soc., Zool.*, Vol. XXII. 1888, p. 20; and Mary J. Rathbun, *Proc. U. S. Nat. Mus.*, Vol. XVI. 1893, p. 92.

Micippe miliaris, Gerstäcker, Archiv. fur Naturges., XXII. 1856, p. 110; and Heller, Crust. Roth. Meer., SB. Ak., Wien, XLIII. 1861, p. 298, pl. i. fig. 1; and Kossmann, Reise Roth. Meer., Crust., pp. 4 and 8; and Miers, Ann. Mag. Nat. Hist., 1885, Vol. XV., p. 11.

Micippa haanii, Stimpson, Proc. Ac. Nat. Sci., Philad., 1857, p. 217; and Miers, Zool. H. M. S. 'Alert,' pp. 517 and 524; and C. W. S. Aurivillius, Kongl. Sv. Vet. Ak. Handl., XXIII. 1888-89, No. 4, p. 52, pl. iv. figs. 1, 1a; and de Man, J. L. S., Zool., Vol. XXII. 1888, p. 20.

Micippe pusilla, Bianconi, Mem. Ac. Sci., Bologna, 1869, Vol. IX. p. 205, pl. i. fig. 1: and Hilgendorf, MB. Ak., Berl., 1878, p. 787.

Micippa inermis, Haswell, P. L. S., N. S. Wales, Vol. IV. 1879, p. 445, pl. xxvi. fig. 3, and Cat. Austral. Crust., p. 24.

Body and ambulatory legs covered with a woolly tomentum.

Carapace with the regions fairly well-defined, the hepatic regions depressed, and the surface closely and evenly granular. From the granular surface there usually, but not always, arise several large vertical spines, which are typically disposed as follows:—one on either supra-ocular hood, two on the gastric region in the middle line, and two placed obliquely on either branchial region. Any or all of these spines may be suppressed. The lateral margins are armed with an irregular series of spines or spinules, and a few spinules may exist on the posterior border in the middle line.

The rostrum is deflexed nearly vertically in the adult female, less vertically in the adult male, and at an angle of 45° or less in the young male: it ends in two curved divergent spines.

The basal antennal joint is produced at its antero-external angle to assist in the formation of the floor of the orbit, but there is a wide hiatus between this process and the post-ocular spine, so that the floor of the orbit is incomplete.

The chelipeds in the adult male are as long as the carapace, are not much stouter than the other legs, and have slender palms, and long slender fingers which, though nearly straight, are closely apposable only in their distal half. In the adult female the chelipeds are equal in length to the post-orbital portion of the carapace, are slenderer than the other legs, and have tapering palms and minute fingers. The merus and carpus of the ambulatory legs are sometimes swollen.

In the Museum collection are specimens, representing all the varieties of this species, from Mergui, Burma, Orissa and Malabar, as well as from Hongkong and Nagasaki.

This species shows quite as well as *M. cristata* the close relation of *Micippa* to *Maia*.

Micippa margaritifera, Henderson.

Micippa margaritifera, Henderson, Trans. Linn. Soc., Zool., 1893, p. 348, pl. xxxvi. figs. 5-7.

Carapace symmetrically sculptured, closely crisply and finely granular, and with the hepatic regions deeply excavate: there are three coarse spinules, disposed in a triangle base outwards, on either branchial region, and a denticle at the anterior boundary of the branchial region; and on the posterior margin are three smooth polished globules "exactly resembling pearls" inset.

The rostrum is long, vertically deflexed in both sexes, and incurved at the tip, which ends in two shallow lobes—the outer angle of each lobe being marked by a spinule.

The basal antennal joint has its antero-external portion greatly produced to complete the floor of the orbit.

The chelipeds in the male are a little longer than the carapace, and have the palms broadened and inflated, and the fingers closely apposable only at the tip. In the female the chelipeds are very much slenderer than the other legs, are only as long as the post-orbital portion of the carapace, and have the hand very slender and tapering. The ambulatory legs are remarkable for their large obtriangular foliaceous meropodites, which in the first pair are specially remarkable, as they are closely apposable to the front, to form, as in *Calappa*, a shield.

In the Museum collection are specimens from both sexes from the Andamans, from Ceylon (34 fms.), and from the Maldives (20-30 fms.).

Micippa margaritifera, var. *parca* nov. I distinguish, provisionally, as a variety, two ovigerous females from the Andamans, in which the middle "pearl" on the posterior border is replaced by a group of spinules, and in which the meropodites of the ambulatory legs are even more broadly foliaceous.

CYPHOCARCINUS, A. M.-Edw.

Cyphocarcinus, A. Milne-Edwards, Nouv. Archiv. du Mus., IV. 1868, p. 73; and Miers, Journ. Linn. Soc., Zool., XIV. 1879, p. 664.

Carapace elongate, subcylindrical, with the gastric region greatly elevated; *the anterior part of the gastric region, along with the front, being vertically deflexed.* The rostrum is formed of two little horns, *each of which is sharply bifurcate at the tip, one branch being directed forwards and outwards, the other being recurved upwards.* The eyes are small and are sunk in small tubular orbits formed in the typical Periceroid manner. The antennæ are small: the basal joint has its antero external angle separated from the rest of the joint by a deep cleft. The external

maxillipeds have the merus dilated at both the internal and external anterior angles. The chelipeds in the female are not longer than the 2nd pair of legs and are hardly stouter. The ambulatory legs have the dactylus recurved, strongly spinate along the posterior edge—prehensile. The sternum in the female forms a hollow, the mouth of which is completely closed by the broad and perfectly flat abdomen.

? *Cyphocarcinus minutus*, A. M.-Edw.

Cyphocarcinus minutus, A. Milne-Edwards, *loc. cit.* pl. xix. figs. 7-12.

Carapace elongate, subcylindrical, the lateral borders nearly parallel in their posterior two-thirds, gently convergent anteriorly. Besides the greatly elevated and anteriorly deflexed gastric region, there are two or three slight bulgings on the side of either branchial region, a slight elevation on the cardiac region, and a median prolongation—overlapping the abdomen—of the posterior border. The hepatic regions are very small and are not visible from the dorsal aspect. The supra-orbital border bears one or two little teeth. The second joint of the antennal peduncle is much enlarged, the third is clavate, and the flagellum is hardly to be distinguished from the hairs on the third joint. The chelipeds in the female are smooth, but the legs are hairy and have the joints, especially the merus, somewhat broadened. Two adult females, one from the Pedro Shoal, the other from the Andamans, are in the Museum collection. The larger of the two is 10 millim. long and has the carapace deeply encrusted by a colony of calcareous Polyzoa.

MACROCÆLOMA, Miers.

Macroceloma, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 665; and 'Challenger' Brachyura, p. 79.

Entomonyx, Miers, Zoology H. M. S. 'Alert,' p. 525.

Carapace subpyriform, but broadened anteriorly by the projecting orbits: the dorsal surface unarmed, or tuberculated, or with a few long spines: the margins without a series of elongated lateral spines, but often with a strongly developed lateral epibranchial spine, preceded by some smaller spines. The spines of the rostrum are well developed. The eyes are retractile within roomy projecting tubular orbits, which are formed much as in *Micippa*.

The antennæ have the basal joint considerably enlarged and armed distally with one or two spines. The mobile portion of the antenna is sometimes concealed by the rostrum, sometimes exposed. The merus of the external maxillipeds is broader than the ischium, and notched at the internal angle for the insertion of the palp.

The chelipeds in the male have the palms enlarged, and the fingers either arched and meeting only at the tip, or not. The ambulatory legs are rather short.

This genus might, without any unnatural stretch, be included with *Micippoides*, A. M.-Edw. (Journ. Mus. Godeffr. I., Crust., p. 254).

Macrocoeloma nummifer, n. sp., Plate IV. fig. 4.

Closely allied to *Macrocoeloma concava*, Miers, 'Challenger' Brachyura, p. 81, pl. x. fig. 2; and to *Entomonyx spinosus*, Miers, Zoology H. M. S. 'Alert,' p. 526, pl. xlvii. fig. B.

Carapace rather more than $\frac{1}{4}$ longer than broad, with the regions well-defined: its surface is regularly and sharply tubercular and is armed with two sharp spines—one behind the other—on the gastric region, two larger—side by side—on the cardiac region, two still larger—one obliquely behind the other—on the lateral epibranchial region, and two very small ones—one behind the other—on the intestinal region.

The rostrum consists of two straight sharp slightly diverging spines, which are about one-fifth or one-sixth the length of the carapace proper, and which in the male are slightly deflexed, but in the female are strongly deflexed.

The basal joint of the antennæ is broadly obtriangular; its antero-external angle is produced to aid in forming the floor of the orbit—this orbital process having its free margin deeply excised; its antero-internal angle carries a stout vertically directed tooth. The orbits, which are in the form of large deep projecting tubes with jagged lips, are constituted as in *Micippa*.

The chelipeds are closely and sharply granular as far as the fingers: in the male they are much stouter than the other legs, are nearly as long as the carapace and rostrum, and have large broad palms, and strongly arched fingers that meet only at the tip. In the female the chelipeds, although not much shorter than those of the male, are hardly stouter than the other legs, and have fingers that can be closely apposed throughout their extent.

The ambulatory legs are slender: in all the meropodite has its posterior margin minutely spinulose, and has a spine on the far end of the upper margin: the first pair, which are the longest, are a little longer than the chelipeds.

The rostrum carapace and legs are beset with stiff curly hairs.

The abdomen in both sexes consists of seven distinct segments.

This species commonly encrusts itself with a plate armour of Orbitolites, rounded fragments of Nullipore, &c.

Loc. Andaman Sea, 17–36 fms. Off Ceylon 34 fms.

			Male.		Adult female.
Greatest length	...	...	21 millim.		21 millim.
„ breadth	...	...	14 „		16 „
Length of chelipeds	...	...	19 „		15 „

TIARINIA, Dana.

Tiarinia, Dana, U. S. Expl. Exp., Crust., pt. I. p. 109.

Tiarinia, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 664.

Carapace subpyriform, somewhat broadened anteriorly, tuberculated, terminating in a rostrum composed of two moderately deflexed horns which are in close contact with one another, except sometimes at the extreme tip.

The eyes are enclosed in tubular orbits formed by a prominent supra-ocular roof the anterior angle of which is strongly produced forwards, by a cupped post-ocular tooth, and by a process of the broad basal antennal joint, all three elements being in the closest contact. The mobile portion of the antenna is completely exposed.

The external maxillipeds have the merus broader than the ischium owing to the expansion of its external angle, and the palp inserted in a slight notch in the internal angle of the merus.

The chelipeds are little enlarged in the male: the ambulatory legs have the dactylus short and claw-like.

The abdomen in both sexes consists of seven distinct segments.

Tiarinia cornigera, (Latr., Edw.)

[*Pisa cornigera*, Latr., Encyc., X. 141.]

Pericera cornigera, Milne-Edwards, Hist. Nat. Crust., I. 335; and Adams and White, 'Samarang' Crust., p. 18.

Tiarinia cornigera, Dana, U. S. Expl. Exped., Crust., pt. I. p. 110, pl. iii. figs. 5a-e; and Stimpson, Proc. Acad. Nat. Sci., Philad., 1857, p. 217; and Haswell, Proc. Linn. Soc., N. S. Wales, Vol. IV. 1879, p. 449, and Cat. Austral. Crust., p. 28; and Miers, Ann. Mag. Nat. Hist., 1880, Vol. V. p. 228; and Mary J. Rathbun, Proc. U. S. Nat. Mus., Vol. XV. 1892, pp. 243 and 276.

? *Pericera tiarata* and *setigera*, Adams and White, 'Samarang' Crust., p. 17.

Tiarinia verrucosa, Heller, 'Novara' Crust., p. 4, taf. i. fig. 3.

Tiarinia mammillata, Haswell, Proc. Linn. Soc., N. S. Wales, Vol. IV. 1879, p. 448, and Cat. Austral. Crust., p. 27.

Body and ambulatory legs with many curly hairs.

Carapace pyriform, the regions well-defined, the surface closely and very variedly pustular nodular and granular, but with the following markings fairly constant:—two parallel longitudinal lines of small nodules between the orbits; a "cross" of larger nodules on the gastric

region, the base of the cross being formed by three pustules; three pustules arranged in a triangle base forwards on the cardiac region, behind which are three conical tubercles arranged in a transverse line; a coarse claw-like tooth at the lateral epibrancial angle.

The rostrum consists of two moderately deflexed spines, which are parallel, and in the closest contact, either throughout their extent, or to near the tips, which may then be upcurved and slightly divergent: the length of the rostrum varies from nearly one-half to one-fourth the length of the carapace, its usual length is about $\frac{2}{7}$ ths that of the carapace.

The antennæ have the basal joint broadened and produced to form the floor of the orbit, the antero-external angle being further produced to form a coarse spine: the next two joints are broadened and fringed with stiff bristles: the flagellum is short. The eyes are ensheathed in orbits which are formed as already described: the supra-ocular eave has a dog's-ear form, and the post-ocular tooth is also salient. The chelipeds in the adult male are as long as the carapace without the rostral spines, and are a little stouter than the other legs: the merus is nodular, most markedly so on the upper surface; the carpus is granular; and the palm—which is a good deal broadened and inflated—and the fingers, are smooth and polished, the fingers being arched and meeting only at tip.

In the female and young male the chelipeds are only as long as the post-orbital portion of the carapace, are slenderer than the other legs, and have the palm slender, the fingers however being arched.

The ambulatory legs are stout, and have strong claw-like dactyli, the posterior border of which is denticulate; the ischium in all is swollen, and is more or less nodular on the upper surface; and the carpus in all is broadened: the first pair, which are considerably the longest, slightly exceed the length of the carapace and rostrum.

In the Museum collection are forty well preserved specimens from the Andamans.

The closeness of the relation between *Tiarinia* and *Micippa* is well seen in the very young of the above species, in which the carapace is depressed and is so broad in front as to be almost oblong, and the rostrum is deflexed at an angle of 45° .

Family II. PARTHENOPIDÆ.

Parthenopiens (part.) and *Canceriens cryptopodes*, Milne-Edwards, Hist. Nat., Crust., I. pp. 347 and 368.

Parthenopinea, Dana, U. S. Expl. Exp., Crust., I. pp. 77 and 136.

Parthenopinea, Miers, Journ. Linn. Soc., Zool., Vol. XIV. p. 641; and ‘Challenger’ *Brachyura*, p. 91.

The eyes are usually retractile within small circular well-defined orbits, the floor of which is nearly continued to the front, leaving a hiatus which is usually filled by the second joint of the antennary peduncle. The basal antennal joint is small, and is deeply imbedded between the inner angle of the orbit and the antennular fossæ.

The antennules fold a little obliquely.

The *Parthenopidæ* are divided by Miers into two sub-families, namely :—

Sub-family I. *Parthenopinæ*; in which the carapace is sometimes sub-pentagonal or ovate-pentagonal, more commonly equilaterally-triangular, and sometimes almost semi-circular or semi-elliptical in outline; in which the cardiac and gastric regions are usually so deeply marked off from the branchial regions on either side as to make the dorsal surface of the carapace trilobed; in which the chelipeds are vastly longer and more massive than the ambulatory legs; and in which the rostrum is either simple or obscurely trilobed.

Sub-family II. *Eumedoninæ*; in which the carapace is, commonly, sharply pentagonal, with the junction of the antero-lateral and postero-lateral borders strongly produced; in which the cardiac and gastric regions are not conspicuously marked off from the branchial regions; and in which the chelipeds are of moderate size.

Sub-family I. PARTHENOPINÆ, Miers.

Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 668.

Key to the Indian genera.

- I. Carapace not laterally expanded :—
 - 1. Basal antennal joint very short, not nearly reaching the inner canthus of the orbit: fingers of chelipeds very strongly incurved... LAMBRUS.
 - 2. Basal antennal joint nearly reaching the inner canthus of the orbit: fingers slightly incurved PARTHENOPE.
- II. Carapace more or less expanded to form a vault in which the ambulatory legs are concealed :—
 - 1. Carapace transversely triangular; greatly expanded both laterally and posteriorly CRYPTOPODIA.
 - 2. Carapace transversely triangular; expanded laterally, but not posteriorly: a ridge on the pterygostomial region..... HETEROCRYPTA.

3. Carapace transversely oval ; expanded laterally,
but not posteriorly : no ridge on the ptery-
gostomian region.....
- ÆTHRA.

LAMBRUS, Leach.

Lambrus, Leach, Trans. Linn. Soc., Vol. XI. 1815, pp. 308, 310.
Lambrus, Milne-Edwards, Hist. Nat. Crust., I. 352.
Lambrus, A. Milne-Edwards, Miss. Sci. Mex., Crust., I. p. 146.
Lambrus, Miers, J. L. S., Zool., Vol. XIV. 1879, p. 668 ; and ‘ Challenger ’ Brachy-
ura, p. 91.

Carapace either broadly triangular with rounded sides and pointed front, or ovate-pentagonal with front pointed but extremely short: the surface is granular, or tubercular, or spiny.

The eyes are enclosed in distinct orbits, which have a suture above and a hiatus below, the hiatus being occupied by the second joint (true third joint) of the antennal peduncle.

The antennules fold obliquely. The antennæ are small: their basal joint, which is extremely short, and does not reach the front, is wedged in between the antennulary fossa and the large lobe that constitutes the floor of the orbit.

The buccal frame is usually quadrangular, but is sometimes a little narrowed in front; it is completely closed by the external maxillipeds: the epistome is sometimes very large, sometimes narrow.

The chelipeds are usually of immense size and length, out of all proportion to the short slender ambulatory legs: the meropodite and “hand” are usually prismatic, with the borders strongly dentate: the fingers are much shorter than the palm, and are abruptly curved inwards and a little downwards.

The abdomen of the female usually consists of seven segments; that of the male of five or six.

Professor A. Milne-Edwards, (Miss. Sci. Mex., Crust., I. pp. 146–148) subdivides the genus *Lambrus* into ten sub-genera, the independence of all of which, however, is not universally admitted.

The sub-genera at present known to exist in Indian waters are shown in the following

Key to the Indian sub-genera of the genus Lambrus.

- I. Carapace tuberculate, ovate-pentagonal, the rostrum not
breaking beyond the general outline of the body: the
buccal frame a little narrowed in front.....
- LAMBRUS.

- II. Carapace strongly carinated or tuberculated, broadly triangular (considerably broader than long), with rounded sides and a broad but sharp-pointed projecting rostrum: no post-ocular constriction: chelipeds with the arm and hand straight, sharply trigonal, the edges of these joints, as also the outer edge of the carpus, being very sharply and stoutly serrated..... PLATYLAMBRUS.
- III. Carapace granular or spiny, usually as long as broad, with a projecting rostrum, and a very distinct post-ocular constriction RHINOLAMBRUS.
- IV. Carapace granular, broader than long, and with the postero-lateral angle produced to form a great blade-like spine. Pterygostomian region deeply channelled, obliquely, the channel being closed below by thick fringes of hairs..... AULACOLAMBRUS.
- V. Carapace worn and eroded, broader than long, almost semi-circular in outline, with the postero-lateral angle produced; the rostrum more or less deflexed, and not, or hardly, breaking the general outline: no post-ocular, but a fairly distinct post-hepatic constriction: chelipeds with the arm and hand indefinitely contorted, not sharply trigonal; and with their edges, if spinate, irregularly and bluntly so; the carpus quite smooth externally: the chelipeds are short for the genus..... PARTHENOLAMBRUS.

Sub-genus LAMBRUS, A. Milne-Edwards.

Lambrus, A. Milne-Edwards, Miss. Sci. Mex. Crust., I. p. 146.

Lambrus, Miers, 'Challenger' Brachyura, p. 92, (*part.*)

Carapace ovate-pentagonal, with the surface granular or pustular and but little carinate in the adult: rostrum exceedingly short.

Lambrus longimanus, Leach.

? *Cancer spinosus longimanus*, Rumph, Amboin. Rariteitk., pl. viii. fig. 2.

Cancer macrochelos, Seba, III. xix. 1, 8, 9.

? *Parthenope longimanus*, Fabr. Suppl., p. 353.

? *Cancer longimanus*, Linn., Syst. Nat., II. 1046, 42.

? *Cancer longimanus*, Herbst, Krabben, I. ii. 253, taf. xix. figs. 105, 107.

Lambrus longimanus, Leach, Trans. Linn. Soc., Vol. XI. 1815, p. 310; and Milne-Edwards, Hist. Nat. Crust., I. 354; and Cuvier, Regne Animal, pl. xxvi. fig. 1; (and ? *Lambrus longimanus*, Adams and White, 'Samarang' Crust., p. 30); and Bleeker, Crust. de l'Ind. Archip., p. 17 (*nec syn.* pelagicus, *Rupp.*); and Miers, Ann. Mag. Nat. Hist., 1879, Vol. IV. p. 20, and Zoology H. M. S. 'Alert,' pp. 182 and 200, and 'Challenger' Brachyura, p. 95; and W. A. Haswell, P. L. S., N. S. Wales, Vol. IV. 1879, p. 449, and Cat. Austral. Crust., p. 31; and A. O. Walker, J. L. S., Zool., Vol. XX. 1890, p. 109; and de Man, J. L. S., Zool., Vol. XXII. 1888, p. 21 (*ubi synon.*); and Henderson, Tr. Linn. Soc., Zool., (2) V. 1893, p. 349.

Carapace almost oval transversely, and with the surface granular or pustular. (In the young, besides tubercles, there are some coarse spinules in five series—a median, and two oblique lateral on either side.) The lateral borders are spinulate or crenulate anteriorly, spinate posteriorly, smooth quite posteriorly at the junction with the posterior border: the posterior border, except for a hook-like spinule at either end, and two spinules in the middle line, is smooth: there are often one or two curved spines on the branchial region: the pterygostomian region is quite smooth, but on the inferior branchial region are a few coarse spinules, most distinct at the bases of the legs.

The rostrum, which is symmetrically trilobed, is very small, its length being less than one-twelfth that of the rest of the carapace.

The chelipeds, which are massive, are about four times the length of the carapace in the male, about $3\frac{1}{2}$ times in the female: the *meropodite* is prismatic, or, in transverse section, rhomboidal; its anterior and posterior edges are armed with numerous, somewhat curved, spines—alternating larger and smaller; its upper edge, as sometimes either upper surface, has a row of spinules; its lower edge is rounded, and has a discontinuous series of spinules; its under surfaces are smooth and polished: the *carpus* has 3 or 4 sharp thin teeth on its outer margin: the trigonal *palm* has twelve or more sharp thin lacinated teeth on its outer edge—alternately larger and smaller; along its inner edge is a long series of multicuspid spines; its under edge is finely beaded, and its under surfaces are almost smooth; its upper surface has numerous irregularly disposed spinules and granules: the *dactylus* has numerous spinules on the outer surface of its broad base.

The ambulatory legs have the merus compressed and spinulate as to its edges, especially the posterior (inferior) edge: the longest of the ambulatory legs is hardly longer than the meropodite of the chelipeds.

Colours in life, pale lilac dorsally, white ventrally.

In the Museum collection are numerous specimens from the Madras coast, from Arrakan and Mergui, and from the Andamans.

Sub-genus PLATYLAMBRUS, Stimpson.

Platylambrus and *Enoplolambrus*, A. Milne-Edwards, Miss. Sci. Mex., Crust., I. pp. 146 and 147.

Lambrus, Miers, 'Challenger' Brachyura, p. 92 (*part*).

Carapace carinated or tuberculated, broader than long, broadly triangular with rounded sides and a broad but acute and projecting rostrum: no post-ocular constriction: chelipeds with the meropodite dan palm straight, the former joint prismatic, the latter sharply tri-

gonal, the anterior and posterior borders of both joints sharply laciniate or serrate, as is also the outer edge of the carpus.

Key to the Indian species of the sub-genus Platylambrus.

- | | | |
|---|---|--|
| <p>I. Carapace with three distinct carinæ, one median, and one, oblique, on either side: chelipeds with their surfaces (but not their edges) for the most part smooth: ambulatory legs, with few spines.</p> | { | <p>1. Infra-orbital lobe entire and strongly produced at the inner (inferior) angle to form a great spine plainly visible from above on either side of the rostrum. <i>L. prensor.</i></p> <p>2. Infra-orbital lobe deeply cleft, the inner portion not or hardly visible from above <i>L. carinatus</i>, Edw.</p> |
| <p>II. Carapace covered with great mushroom-like or paxilliform tubercles: chelipeds with their surfaces very strongly spinate or tuberculate: ambulatory legs strongly spiniferous. <i>L. echinatus.</i></p> | | |

Lambrus (Platylambrus) *prensor*, Herbst.

Lambrus prensor, Herbst, Krabben, II. ii. 170, tab. xli. fig. 3.

Lambrus prensor, Milne-Edwards, Hist. Nat. Crust., I. 358.

Lambrus jourdainii, F. de B. Capello, Journ. Sci. Lisb., III. 1870-71, tab. 3, fig. 6.

Lambrus prensor, A. Milne-Edwards, Nouv. Archiv. du Mus., Vol. VIII. 1872, p. 260 (foot-note); and Miss. Sci. Mex., Crust., I. p. 147 (foot-note).

Lambrus prensor, Walker, J. L. S. Zool., Vol. XX. 1890, p. 109 (name only).

Our numerous specimens correspond exactly with Capello's figure and succinct and graphic description. M. A. Milne-Edwards at first assigned Capello's species to *L. carinatus*, Edw., but afterwards to *L. prensor*, and it is this last authority that I now follow.

Carapace broader than long, broadly triangular with the sides rounded: the median and branchial regions are strongly prominent, the former having three small spinules in the middle line, the latter having each two oblique granular ridges, one of which is very faint and runs to the large lateral epibranchial spine, the other of which forms a strong carina, and runs to the large spine at the postero-lateral angle. The antero-lateral margin is armed with 7 or 8 nearly equal-sized close-set compressed teeth, behind which, at the lateral epibranchial angle, is a very large blade-like spine: behind this again, on the postero-lateral border are two large teeth, the outer of which, at the postero-lateral angle, is nearly as large as the lateral epibranchial spine; and lastly on the posterior border are three large curved spines.

The rostrum is acute, concave at base, and slightly recurved at tip: on either side of the rostrum is seen from above a very strong and acute spine formed by the prolongation of the inner margin of the infra-orbital lobe—this lobe is entire.

The chelipeds are massive and are about three times the greatest length of the carapace: their surfaces are almost smooth: the arm is rhomboidal in transverse section, and the palm is sharply trigonal: the lower edges of the arm, wrist and palm form a continuous line of beading: the upper edge of the arm is granular and spinular: the inner or anterior edges of the arm, wrist and hand are spinate—the spines growing larger towards the end of the palm, while the posterior (or outer) edges of the same three joints are very strongly and closely laciniate.

As usual the spines in all cases have a tendency to be alternately larger and smaller.

Of the ambulatory legs the merus, carpus and propodus have the anterior (upper) border strongly and sharply carinate, while the merus has also the posterior border spinate.

This species is not uncommon along the Orissa coast, from 8 to 23 fathoms.

Lambrus (Platylambrus) carinatus, Edw.

Lambrus carinatus, Milne-Edwards, Hist. Nat. Crust., I. 358.

Lambrus carinatus, A. Milne-Edwards, Miss. Sci. Mex., Crust., I. p. 147 (foot-note).

Our specimens, which agree with the diagnoses of M. A. Milne-Edwards completely, are distinguished from those above described as *L. prensor*, (1) by having the mid-dorsal carina formed by three great compressed teeth; (2) by the single, and very high and sharply cut carina on either branchial region; (3) by the smaller size of the spine at the lateral epibranchial angle and of the spine, at the postero-lateral angle, immediately succeeding it; (4) by the form of the infra-orbital lobe, which instead of being entire, is bilobed—the inner lobe, moreover, having a rounded apex, and not being visible from above; (5) by the meropodites of the ambulatory legs having their anterior (upper) edge serrate, not carinate, and by the carpopodites and propodites having the anterior edge smooth.

These differences are constant in a series of twelve specimens, including both sexes.

This species also differs from *L. prensor* in its much smaller size, three ovigerous females having the carapace 11 millim. in its greatest breadth (exclusive of spines), while ovigerous females of *L. prensor* have the carapace 28 to 30 millim. in its greatest breadth exclusive of spines.

[? *Lambrus* (*Platylambrus*) *holdsworthii*, Miers.

Lambrus holdsworthii, Miers, Ann. Mag. Nat. Hist., Vol. IV. 1879, p. 19, pl. v. fig. 3; and 'Challenger' Brachyura, p. 93; and Henderson, Trans. Linn. Soc., (2) V. 1893, p. 350.

The single specimen that I doubtfully refer, from Miers' figure and description, to this species, has a close resemblance to both the species identified above as *L. prensor* and *L. carinatus*. It differs from them both (1) in having numerous scattered tubercles on the carapace, and (2) in having the large spine at the lateral epibranchial angle and the two outer spines on the postero-lateral margin all of about the same size. It resembles *L. prensor*, and differs from *L. carinatus*, in not having the branchial region traversed by a single sharp-cut carina: and it resembles *L. carinatus*, and differs from *L. prensor*, in having a median line (though not a high carina) of three large teeth, in having the infra-orbital lobe deeply cleft and not exceedingly produced, and in having the anterior (or upper) edge of the meropodites of the ambulatory legs dentate instead of carinate.]

Lambrus (*Platylambrus*) *echinatus*, Herbst.

Cancer echinatus, Herbst, Krabben, I. ii. 255, taf. xix. figs. 108-109.

Parthenope giraffa, Fabr., Supplement, p. 353.

[*Maia echinatus* and *giraffa*, Bosc, I. 250].

Lambrus giraffa, Desmarest, Consid. Crust., p. 85.

Lambrus echinatus, Milne-Edwards, Hist. Nat. Crust., I. 356.

Lambrus echinatus, Miers, 'Challenger' Brachyura, p. 93.

Carapace broader than long, broadly triangular with the sides rounded: the gastric and cardiac regions are elevated, and are delimited on either side from the elevated branchial regions by broad and deep grooves. The entire carapace is covered, but not very densely, with large mushroom-like and paxilliform tubercles, the spaces between which are occupied, but not densely, by short, crisp, upstanding hairs. The lateral margins are armed with ramose spines, which increase in size from before backwards: the posterior and part of the postero-lateral margins are armed with tubercles like those on the surface of the carapace. The granular rostrum is broad and concave at the base, and is then suddenly narrowed to form a little peak.

The chelipeds which are from $3\frac{1}{2}$ (female) to $3\frac{3}{4}$ (male) the greatest length of the carapace, are distinguished by having their upper aspect (edges and surfaces) covered with ramose spines, and their under aspect covered with great pearly tubercles. The ambulatory legs are distin-

guished by the large and numerous spines on their 3rd, 4th and 5th joints.

This species is not uncommon off the Orissa coast from 7 to 23 fathoms.

Sub-genus RHINOLAMBRUS, A. Milne-Edwards.

Rhinolambrus, A. Milne-Edwards, Miss. Sci. Mex., Crust., I. p. 148.

Lambrus, Miers, 'Challenger' Brachyura, p. 92 (*part.*).

Carapace triangular, usually as long as broad, with a broad projecting somewhat declivous rostrum and a very distinct post-ocular constriction; surface of carapace very commonly, but not always, spiny and granular.

Key to the Indian species of the sub-genus *Rhinolambrus*.

- | | | | |
|---|--|--|-------------------------|
| I. Chelipeds stout, three times to twice or less the length of the carapace and rostrum. | 1. Carapace and chelipeds very closely covered with large rugged granules and sharp ramose spines. | i. Chelipeds nearly three times the length of the carapace and rostrum..... | <i>L. contrarius.</i> |
| | | ii. Chelipeds not two-and-a-half times the length of the carapace and rostrum..... | <i>L. longispinis.</i> |
| | 2. Carapace with few depressed tubercles, or nearly smooth: chelipeds with blunt teeth or smooth granules. | i. Chelipeds three times the length of the carapace and rostrum..... | <i>L. pelagicus.</i> |
| | | ii. Chelipeds not twice the length of the carapace and rostrum | <i>L. gracilis.</i> |
| II. Chelipeds slender, three-and-a-half to five times the length of the carapace and rostrum. | 1. Carapace at least as long as broad: large erect turret-like spines on the carapace. | i. A single turret on the cardiac region, and on either branchial region: two large diverging spines in the middle line on the posterior border... | <i>L. turriger.</i> |
| | | ii. Two turrets on the cardiac region, and two on either branchial region: a single spinule on the posterior margin..... | <i>L. cybelis.</i> |
| | 2. Carapace broader than long; large spines of ordinary form on the carapace | | <i>L. petalophorus.</i> |

Lambrus (Rhinolambrus) contrarius, Herbst.

Cancer contrarius, Herbst, Krabben, III. iv. 18, tab. lx. fig. 3.

[*Parthenope spinimana*, Lamk., Hist. Anim. Sans. Vert., V. 239.]

Lambrus spinimanus, Desmarest, Consid. Crust., p. 86, pl. iii. fig. 1.

Lambrus contrarius, Milne-Edwards, Hist. Nat. Crust., I. 354.

Lambrus contrarius, Bleeker, Recherches Crust. de l'Ind. Archip., p. 18.

Lambrus contrarius, A. Milne-Edwards, Maillard's l'ile Réunion, Annexe F, p. 10.

Lambrus contrarius, Brocchi, Ann. Sci. Nat., (6) II. 1875, Art. 2, p. 98, pl. xviii. figs. 166, 167 (♂ appendages).

Lambrus contrarius, Richters, in Möbius, Meeresf. Maurit., p. 145.

Lambrus contrarius, Miers, Ann. Mag. Nat. Hist., 1880, Vol. V. p. 230; and 'Challenger' Brachyura, p. 94.

Lambrus contrarius, J. R. Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 350.

Carapace, with rostrum, slightly longer than broad, everywhere covered with jagged granules and spines: the regions are strongly convex, and, usually, in the middle line, are three or four, and again on either branchial region, one or two spines of predominant size. The rostrum is broad, prominent, declivous, and spiny or granular, both on the upper surface and along the margins. The hepatic regions are very prominent, and their angle is strongly produced. The orbital edge is prominent and the post-orbital constriction strongly pronounced.

The chelipeds are about three times the length of the carapace and rostrum, and are extremely massive, the hands especially: above they are covered with large sharp jagged spines with rough tubercles interspersed; below they are everywhere covered with rasp-like granules. The ambulatory legs are rather stout for a *Lambrus*, and have the merus somewhat spiny along one or both edges.

Colours in spirit, mottled pink, tips of fingers purple-black, ambulatory legs banded alternately yellow and bluish pink.

Our largest specimens, a male and a female, are from off Colombo, 26½ fathoms, and have a span (of chelipeds) of 290 millim. and 265 millim. respectively.

Lambrus (Rhinolambrus) longispinis, Miers.

Lambrus longispinus, Miers, Ann. Mag. Nat. Hist., 1879, Vol. IV. p. 18; Zoology H. M. S. 'Alert,' pp. 182 and 199; and 'Challenger' Brachyura, p. 93.

Lambrus longispinus, de Man, Archiv. fur Naturgesch., LIII. 1887, p. 229.

Lambrus longispinus, Walker, Journ. Linn. Soc., Zool., Vol. XX. 1890, p. 109.

Lambrus longispinus, Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 350.

Lambrus spinifer, Haswell, P. L. S., N. S. Wales, Vol. IV. 1879, p. 451, pl. xxvii. fig. 1; and Cat. Aust. Crust., p. 34.

Carapace, with rostrum, little longer than broad, its surface covered with spiny tubercles: There are four prominent spines in the middle

line, of which three are on the cardiac and one is on the gastric region; in front of the latter are two smaller spines placed transversely: on the branchial regions are some small spines set in two oblique series, and one large spine. On the antero-lateral margins are about nine small close-set blunt faintly-lacinated teeth, slightly increasing in size posteriorly; on the postero-lateral margin are two large spines; and on the posterior border, in the middle line, is a pair of spines. The rostrum is broad, prominent, acute and declivous. The post-ocular constriction is distinct; and the hepatic regions are well marked, with the outer border denticulate. The chelipeds in the male are about $2\frac{1}{3}$ times the length of the carapace and rostrum: they much resemble those of *L. contrarius*, the spines being for the most part jagged, and the tubercles rasp-like. On the anterior (inner) margin of the arm are 10 or 12 spines alternating in size, the last three being very small; on the upper surface of the arm three spines are very prominent, as are three or four on the posterior (outer) edge. On the anterior (inner) margin of the hand are 7 or 8 spines increasing in size from behind forwards; while on the posterior margin are numerous spines—only three or four of which are large. The lower surface of the arms, wrists and hands is closely covered with large round rasp-like tubercles. The merus and sometimes the two following joints of the ambulatory legs, have the margins dentate.

Our single specimen from the Arrakan coast, 13 fms., is plainly the same as Haswell's *L. spinifer*, judging from his figure (*tom. cit.*) Both from that figure and from our specimen I should consider the species to be more nearly related to *L. contrarius* than to *L. validus*.

Lambrus (Rhinolambrus) pelagicus, Rüpp.

Lambrus pelagicus, Rüppell, Beschr. u. Abbild. 24 Art. Krabben des Roth. Meer., p. 15, pl. iv. fig. 1.

Lambrus pelagicus, Milne-Edwards, Hist. Nat. Crust., I. 355.

Lambrus pelagicus, Rüpp. (prob. = *affinis*, A. M.-Edw.) Miers, Ann. Mag. Nat. Hist., 1879, Vol. IV. p. 21.

Lambrus pelagicus, Ortmann, Zool. Forsch. in Austral. u. Malay. Archip., Jena, 1894, p. 46.

Lambrus affinis, A. M.-Edw., Nouv. Archiv. du Mus., VIII. 1872, p. 261, pl. xiv. fig. 4.

Lambrus affinis, Haswell, Cat. Austral. Crust., p. 34.

Lambrus affinis, Miers, 'Challenger' Brachyura, p. 95.

Lambrus affinis, J. R. Henderson, Trans. Linn. Soc., Zool. (2) V. 1893, p. 350.

[*Lambrus affinis*, F. Muller, Verh. Ges. Basel, VIII. p. 473.]

[*Lambrus affinis*, Cano, Boll. Soc. Nat. Napol., III. 1889, p. 187.]

Carapace, with rostrum, as long as broad: its regions well delimited and faintly pitted and pimples, the furrows between the regions

being smooth and bare—except for a pimple at each of the four angles of the cardiac region. On either branchial region, above the postero-lateral angle of the carapace, is a bluntly conical spine. The rostrum is very broad, and is concave and bluntly pointed: on either side above the eye is a little eminence which carries a tuft of long silky hairs. The post-ocular constriction is distinct, as is also the post-hepatic. The antero-lateral (including the hepatic) margin is faintly crenulated: the posterior border is quite smooth.

The chelipeds in the male are three times the length of the carapace, but not more than $2\frac{1}{2}$ times in the female: the anterior (or inner) margin of the arm and hand is evenly and bluntly dentate, or crenulate; the posterior (or outer) margin in the same joints is as evenly but much more bluntly and indistinctly dentate, and the lower margin faintly beaded: the carpus is either quite smooth or has a few nodules.

The ambulatory legs are smooth, rather stout, and are longer than the hand. In the male near the anterior border of the 6th abdominal tergum is a strong spine. This is a fairly common species at the Andamans.

Lambrus (Rhinolambrus) gracilis, Dana.

Lambrus gracilis, Dana U. S. Expl. Exp. Crust., pt. I. p. 137, pl. vi. figs. 6 a-b.

Lambrus gracilis, Miers, 'Challenger' Brachyura, p. 94.

Lambrus deflexifrons, Alcock and Anderson (*nec* Miers), J. A. S. B., 1894, pt. ii. p. 199.

Carapace, with rostrum, considerably longer than broad; with a pronounced post-ocular constriction; somewhat rhomboidal in shape: the regions are extremely prominent, especially the cardiac, which is capped by a conical tooth, and the branchial, which rises into an oblique crest terminating posteriorly in a tooth: the hepatic region forms a prominent tooth, behind which the rounded lateral margins are 6 or 7 toothed: there are two laminar teeth on the posterior border: otherwise the carapace is smooth. The rostrum is broad, deflexed, and distinctly trilobed towards the tip.

The chelipeds are not quite twice the length of the carapace and rostrum; and in the adult are not symmetrical—one, either right or left, having the hand much larger than the other. In the young the asymmetry is hardly noticeable. The *arm* has the anterior (inner) and posterior (outer) border irregularly armed with compressed blunt spines, of which the one at the far end of the outer border is the largest—being almost foliaceous: the *hand* has its inner and outer borders armed in the same irregular way, two or three of the teeth on the outer border, and one on the inner border being enlarged: the under surfaces

of the chelipeds are quite smooth, but the upper surface of the arm has an incomplete longitudinal line of beading. The ambulatory legs are long and particularly slender.

In the Museum collection are specimens of males, ovigerous females and young, from the Andamans and from off Ceylon.

Lambrus (Rhinolambrus) deflexifrons, Miers.

Lambrus deflexifrons, Miers, Ann. Mag. Nat. Hist., Vol. IV. 1879, p. 21, pl. v. fig. 5. Ceylon.

This species, which is not represented in the Museum collection, is described as follows by Miers:—

“The carapace is strongly constricted behind the orbits, with the cardiac region very convex, and with an oblique but shallow sulcus on the branchial regions, and is covered with closely-set small tubercles; the antero-lateral margins are unarmed; but there are two larger tubercles or small spines on the postero-lateral margins. The rostrum is vertically deflexed, triangular, and granulated above. The basal antennal joint is very small; the epistoma is large; the sub-hepatic and pterygostomian regions are not channelled. The anterior legs have the arm rounded and tuberculate above, with small spines on its anterior margin; the wrist is tuberculate; the hand with a few tubercles on its upper surface, the anterior margin armed with about ten, and the posterior with four granulated spines. The under surface of arm, wrist, and hand is closely granulated. The ambulatory legs are smooth, and are not compressed and cristate as usual in the genus.

The vertically deflexed rostrum and carapace, devoid of spines on its surface and anterior margins, and non-compressed ambulatory legs are characteristic of this species. It seems to be allied to *L. gracilis*, Dana, a species from the Fijis, in the form of the carapace and legs; but in that species the carapace has a spine on the cardiac and each branchial region, and elsewhere appears to be smooth.”

Lambrus (Rhinolambrus) turriger, Ad. & Wh.

Lambrus turriger, White, P. Z. S., 1847, p. 58; Ann. Mag. Nat. Hist., Vol. XX. 1847, p. 63; and Adams and White, ‘Samarang’ Crust., p. 26, pl. v., fig. 2.

Lambrus turriger, W. A. Haswell, Proc. Linn. Soc., N. S. Wales, Vol. IV. 1879, p. 449; and Cat. Austral. Crust., p. 32.

LAMBRUS TURRIGER, MIERS, ZOOLOGY H. M. S. ‘ALERT,’ p. 201; and ‘Challenger’ Brachyura, p. 96.

Carapace, with rostrum, a little broader than long; slightly granular; the regions well-defined and armed with huge, erect or semi-erect, knob-headed spines, as follows:—one on the gastric region, in the mid-

dle line, one on the cardiac region in the middle line, and one on each branchial region: there is sometimes a little spinule in front of the gastric spine, and one in front of either branchial spine; and on the posterior border, in the middle line, are two divergent spines directed backwards. The rostrum is broad, concave between the eyes, somewhat deflexed, and may be described as trilobed near the tip—since it is there suddenly truncated and continued in the middle line only.

There is a distinct post-ocular constriction, and the hepatic regions are well-defined laterally.

The chelipeds are long slender and rugose: the arm is cylindrical, and the palm subcylindrical, becoming enlarged and trigonal near the fingers: in the male the chelipeds are from $4\frac{1}{2}$ to $5\frac{1}{2}$ times the length of the carapace and rostrum, in the female they are but $3\frac{1}{3}$ to $3\frac{1}{2}$ times this length.

The ambulatory legs are long, very slender, and perfectly smooth.

In the Museum collection are numerous specimens from the Andamans, from the Madras coast, and from off Ceylon at 32 to 34 fathoms.

There are undoubtedly two sorts of males: one sort resembling the female in having the chelipeds comparatively short, the other sort having very long chelipeds.

Lambrus (Rhinolambrus) cybelis, n. sp.

This species closely resembles *L. turriger*, from which it differs only in the following characters:—

- (1) the regions of the carapace are all more elevated, and on the cardiac region—one behind the other, in the middle line—as well as on either branchial region, are *two* very large semi-erect spines of equal size; while in the middle of the granular posterior border is a single spinule:
- (2) the surface of the carapace, besides being granular, is very evenly and regularly pitted or reticulated:
- (3) the rostrum, which is nearly one-third the greatest breadth of the carapace, is more distinctly trilobed:
- (4) the chelipeds (which in females and young males are only $3\frac{1}{4}$ to $3\frac{1}{2}$ times the length of the carapace and rostrum), though of the same general slender proportions as in *L. turriger*, have the hand distinctly trigonal throughout, and the arm and hand armed with sharp lacinated spines on the upper aspect.

A young male from off Ceylon, 34 fms., and two probably half-grown males, and an ovigerous female, from off the Andamans, 41 to 86 fathoms.

The characters that distinguish this species are constant throughout the series, without any modification or variation.

Greatest length of carapace in ovigerous female	...	15 millim.
Do. breadth do. do. do.	...	15 millim.
Length of chelipeds in ovigerous female	...	52 millim.

Lambrus (Rhinolambrus) petalophorus, n. sp.

Carapace of the same general shape as in *L. turriger*, but broader posteriorly, where its breadth exceeds its length with the rostrum. The hepatic region is extremely well demarcated, not by its prominence, but by its almost vertical outer wall.

The cristiform antero-lateral border, which runs from the angle of the buccal frame outside the limit of the hepatic region, is festooned by 7 or 8 close-set thin teeth, and there is a strong upcurved spine at the postero-lateral angle.

The postero-lateral border carries three teeth, the innermost of which is hardly less prominent than that at the postero-lateral angle: the posterior border is finely denticulated.

The rostrum, the breadth of which is about $\frac{2}{7}$ the greatest breadth of the carapace, is elegantly trilobed.

The regions of the carapace are strongly elevated, and have the surface pitted or reticulated: in the middle line on the gastric region is a single erect conical spine, on the cardiac region two; and on either branchial region there is a spine. In front of the gastric spine are two spinelets, disposed transversely.

The supra-orbital margin is strongly arched, and the infra-orbital lobe is cut into two elegantly crimped leaflets or petals.

The post-ocular constriction is distinct.

The chelipeds in the male are four and-a-half times the length of the carapace and rostrum: the *arm* is slender and subcylindrical, with a line of many spinules along both the inner and outer borders, a broken line of sharp tubercles along its upper surface, and a line of granules along its lower border, but is otherwise smooth and polished: the *carpus* has a few coarse spinules on its outer surface: the *hand*, though distinctly trigonal, is long and slender, but is enlarged at the far end; its inner and outer borders are irregularly and unequally lacinated, the teeth becoming larger and closer set towards the far end; except for a line of beading along its lower border and an occasional spinule on its upper surface, its surfaces are smooth and polished: the movable *finger* has its broad base denticulated.

The ambulatory legs are very slender and very short—only one-

fifth longer than the carapace: except for a line of spinules along the posterior (lower) border of the meropodite they are smooth.

Greatest length of carapace (male) ... 16 millim.

„ breadth „ ... 18 „

Length of cheliped ... 72 „

Off Ceylon in deep-water.

Colours in spirit: chelipeds and legs purplish white, carapace dull slaty purple.

Sub-genus AULACOLAMBRUS, A. M.-Edw.

Aulacolambrus, A. Milne-Edwards, Miss. Sci. Mex. Crust., I. p. 147.

Aulacolambrus, Miers, 'Challenger' Brachyura, p. 97.

Pterygostomian region traversed, from the orbit to the afferent branchial orifice, by a deep channel, which is closed and converted into a tube by thick fringes of hairs: the lateral epibranchial spine is of huge size: the edges of the carapace chelipeds and legs are more or less conspicuously hairy.

Key to the Indian species of the sub-genus *Aulacolambrus*.

- | | | | |
|---|---|--|------------------------|
| I. Carapace as long as broad, with a projecting rostrum and a distinct post-ocular constriction; its surface closely covered with rasp-like tubercles: carapace and legs not conspicuously hairy..... | | <i>L. sculptus</i> . | |
| II. Carapace broader than long, its surface irregularly tuberculate; rostrum not or hardly projecting: no post-ocular constriction: margins of carapace, chelipeds and legs fringed with remarkably long tangled hairs. | 1. Antero-lateral border with large spines in front of the large lateral epibranchial spines: spines of inner edge of hand strongly curved upwards and outwards.. | <i>L. curvispinis</i> . | |
| | | | |
| | 2. Antero-lateral border with small teeth in front of the large lateral epibranchial spines: spines of inner edge of hand not curved. | a. No spines in middle line of carapace, or on branchial regions..... | <i>L. hoplonotus</i> . |
| | | b. Some spines in middle line of carapace, and on branchial regions: spines on outer edge of hand very long..... | <i>L. whitei</i> . |

Lambrus (Aulacolambrus) sculptus, A. M.-Edw.

Lambrus sculptus, A. Milne-Edwards, Nouv. Archiv. du Mus., VIII. 1872, p. 258, pl. xiv. fig. 3.

Lambrus sculptus, Miers, 'Challenger' Brachyura, p. 98.

Lambrus sculptus, J. R. Henderson, Trans. Linn. Soc., Zool. (2) V. 1893, p. 350.

The carapace is triangular, broad behind, and as long as broad. The rostrum is triangular, dorsally grooved and declivous, and tapers

to a rounded point. The regions are elevated, and the median are separated from the branchial by deep furrows: all the regions are closely covered by rasp-like tubercles.

The lateral borders are tubercular, and end posteriorly in a large spine directed outwards and somewhat backwards.

Internal to this large spine is a much smaller spine; and the posterior border is tuberculate.

The chelipeds are a little more than twice the length of the carapace, with the inner and outer borders serrated, and the upper surface covered with tubercles like those on the carapace: amid the serrations five large teeth on the outer border of the hand are very conspicuous.

The ambulatory legs are slender and smooth.

The epistome is sculptured, and is very deeply excavated in the middle line.

The pterygostomian region is traversed by a canal running parallel with the buccal frame: the canal is perfectly smooth, and is closed below, and thus converted into a tube, by thick fringes of long hairs.

I believe, with Ortmann, that this species is very probably identical with *L. pisoides*, Adams and White ('Samarang' Crustacea, p. 28, pl. v. fig. 4), and perhaps with *L. diacanthus* de Haan (Faun. Japon. Crust., p. 92, pl. xxiii. fig. 1).

It is a fairly common species at the Andamans and Nicobars.

Lambrus (Aulacolambrus) hoplonotus, Ad. & Wh.

Lambrus hoplonotus, Adams and White, 'Samarang' Crust., p. 35, pl. vii. fig. 3.

Lambrus hoplonotus, A. Milne-Edwards, Nouv. Archiv. du Mus., VIII. 1872, p. 258.

Lambrus hoplonotus, Miers, Ann. Mag. Nat. Hist., 1879, Vol. IV. p. 22; and 'Challenger' Brachyura, p. 98.

Lambrus hoplonotus, Haswell, P. L. S., N. S. Wales, Vol. IV. 1879, p. 450; and Cat. Austral. Crust., p. 33.

Carapace with the outline in front of the huge lateral epibranchial spine almost semi-circular, the rostrum being extremely short and not breaking through the general outline. The carapace is granular, and has the regions well-defined but not elevated.

The symmetrically rounded antero-lateral margin is regularly festooned with little round teeth of uniform size, and ends at a great projecting lateral epibranchial spine: behind and internal to this spine is another small spine: the posterior border is finely granular. The chelipeds, legs, and margins of the carapace are fringed with long hairs; and the pterygostomian region is channelled just as in *L. sculptus*.

The chelipeds in the male are a little more, and in the female a

little less than three times the length of the carapace: the arms and hands are depressed trigonal, and the fingers small: the *arm* has its inner edge sharply tuberculate, its outer edge strongly 4 or 5-spinate, its lower edge beaded, its upper surface with a row of 4 or 5 large granules: the *wrist* has three strong spines along its outer edge: the *hand* has its inner edge sharply 9 to 11-dentate, its outer edge very strongly 6 to 8-spinate, with small spinules alternating with the large spines, and its lower edge sharply and finely beaded. The ambulatory legs are perfectly smooth.

All our specimens are typical according to Adam and White's figure. This species is common at the Andamans.

Lambrus (Aulacolambrus) curvispinis, Miers.

Lambrus curvispinis, Miers, Ann. Mag. Nat. Hist., Vol. IV. 1879, p. 24; and 'Challenger' Brachyura, p. 98.

This species, which Miers in his latest notice of it considers to be one of the numerous varieties of *L. hoplonotus*, resembles the latter species in every particular except (1) that the rostrum ends in a little bacillar spinule; (2) that the antero-lateral borders of the carapace instead of being crenate are powerfully spinate; (3) that the spines along the inner edge of the palm are strongly hooked upwards and outwards; and (4) that the inner surface of the arm bears a row of spinules.

This species, or variety, which is twice the size of *L. hoplonotus*, is also very common at the Andamans.

Lambrus (Aulacolambrus) whitei, A. M.-Edw.

Lambrus carinatus, Adams and White (*nec* Edw.), 'Samarang' Crust., p. 27, pl. v. fig. 3.

Lambrus whitei, A. Milne-Edwards, Nouv. Archiv. du Mus., VIII. 1872, p. 260; and Miss. Sci. Mex. Crust., I. p. 147 (foot-notes).

Lambrus whitei, Miers, 'Challenger' Brachyura, p. 98.

In the form of the carapace, the hairiness of the edges of the legs and carapace, and in the presence of the pterygostomian canal, this species almost exactly resembles the two preceding species.

The antero-lateral borders are sharply crenulate and end at a large outwardly and backwardly directed spine, internal to which is another largish spine; while on the posterior border are four largish spines. The carapace is granular, and in the middle line are two conical spines, one on the gastric the other on the cardiac region, while on either branchial region are two similar spines.

The spinature of the chelipeds is, in disposition, similar to that

of *L. hoplonotus*, but the spines, especially those on the outer edge of the hand, are very much longer, slenderer, and more acute.

Several specimens, including ovigerous females, of this small species are in the Museum collection, from Arakan; and from off Ceylon, 34 fathoms.

The figure in Adams and White is an admirable illustration of this species.

Sub-genus *PARTHENOLAMBRUS*, A. M.-Edw.

Parthenolambrus, A. Milne-Edwards, Miss. Sci. Mex. Crust., I. p. 148.

Parthenopoides, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 672.

Parthenolambrus, Miers, 'Challenger' Brachyura, p. 99.

Carapace semi-elliptical or semi-circular, with a nearly straight posterior margin, the postero-lateral angles being strongly produced. Chelipeds of no great length, never sharply serrate, and with the arms and hands indefinitely contorted. The rostrum is more or less deflexed.

Key to the Indian species of the sub-genus Parthenolambrus.

- I. Carapace with the hepatic regions very prominent in the antero-lateral margin:—
 1. Carapace broader than long, strongly convex, nodular and eroded: chelipeds less than twice the length of the carapace..... *L. tarpeius*.
 2. Carapace as long as broad, compressed, with cristiform edges, its surface almost devoid of granules: chelipeds more than twice the length of the carapace *L. harpax*.
- II. Carapace with the hepatic regions distinct, but not markedly prominent:—
 1. Rostrum almost vertically deflexed: ambulatory legs *dentate*, but without true spines..... *L. calappoides*.
 2. Rostrum moderately deflexed, with a prominent median lobe: meropodites of ambulatory legs each with three rows of close sharp spines..... *L. beaumontii*.

Lambrus (Parthenolambrus) calappoides, Ad. and Wh.

Parthenope calappoides, Adams and White, 'Samarang' Crustacea, p. 34, pl. v. fig. 5.

Lambrus calappoides, Haswell, P. L. S., N. S. Wales, Vol. IV. 1879, p. 452; and Cat. Austral. Crust., p. 35.

Lambrus calappoides, Miers, Zoology of H. M. S. 'Alert,' pp. 517 and 527; and 'Challenger' Brachyura, p. 101.

Parthenolambrus calappoides, R. I. Pocock, Ann. Mag. Nat. Hist., 1890, Vol. V. p. 75.

Carapace almost semi-circular in outline, with an indentation

behind the hepatic regions: the regions are well-delimited, but not carinated or sharply raised; and the surface is granular without any very large spines or nodules. The rostrum is deflexed almost vertically. The eyes are sunk in deep orbits with swollen margins. The antero-lateral margins, and sometimes the postero-lateral, are closely festooned or incised, but in an irregular manner.

On either side of the gastric region is a deep hollow; and on either side of the front part of the cardiac region is a deep foramen.

The chelipeds in the male are not twice the length of the carapace: the arm is coarsely spinate along its convex inner border, and the hand still more coarsely and bluntly spinate along its contorted upper border.

Ambulatory legs compressed, the 3rd to 5th joints having the edges irregularly dentate, this being most marked in the case of the last pair.

The animal as a whole has a sort of boiled appearance.

The species is very variable, and owing to frequent and extensive incrustation with barnacles, foraminifera, etc., is very hard to describe.

In the Museum collection are specimens from the Andamans, Mergui, Arakan, Ceylon, and Malabar coast.

Lambrus (Parthenolambrus) beaumontii, n. sp.

Very near to *Parthenope bouvieri* and *trigona*, A. M.-Edw., (v. Rev. et. Mag. Zool. (2) XXI. 1869, pp. 350-353).

This species comes from deepish water, and is small and very variable — the adult female, especially, being so unlike the male, that if it were found apart, it would be considered distinct.

The carapace is semicircular, the curve being broken (1) by the hepatic regions, and (2) by the projecting middle lobe of the rostrum. The elegantly curved antero-lateral borders are closely festooned by a row of thin, sharp, lacinated teeth, the bases of which are fused together; of these teeth the first three, situated on the hepatic region, are smaller than the others, which are of equal size, except the last, and this forms the summit of the salient upcurved postero-lateral angle. The postero-lateral borders are irregularly serrated, and there is a spinule in the middle of the posterior border. The regions of the carapace are very salient and form three cariniform elevations: there is usually, but not always, in the male, and seldom in the female, a recurved spinule on the gastric region, in the middle line; and generally in the male, but seldom in the female, the conical cardiac region is surmounted by one or two spinules.

The rostrum is trilobed, the small lateral lobes being formed each of a group of granules, and the larger, projecting, median lobe being spathulate, smooth, and somewhat deflexed.

The surface of the carapace is somewhat granular and eroded, but this is often concealed by a glazing of stony algæ.

The orbits have the edges finely and evenly serrate. The third joint of the antennal peduncle is spiniferous.

The segments of the sternum, as also the abdominal terga, are all deeply cut, and their surface, like that of the external maxillipeds and pterygostomian regions, is very sharply, closely and evenly granular.

The chelipeds in the male are $2\frac{2}{3}$ times the length of the carapace; in the female hardly twice that length: in both sexes they are top-heavy, owing to the distal enlargement of the palm and the great size of the fingers; they are everywhere granular, but most markedly so on the under surface: the inner border of the arm and palm, and the upper border of the movable finger, are irregularly spinulate, the outer border of the hand may have two or three irregularly disposed blunt teeth, and that of the arm a few spicules. The ambulatory legs characterize this species, for the meropodites, in all, are compressed-trigonal with all three edges strongly, sharply and closely spinate; the anterior, and often also the posterior, margins of the next two joints also are spinate or dentate.

		Male.	Female.
Greatest length of carapace	...	10·5 millim.	9 millim.
„ breadth „	...	10·5 „	9 „
Length of chelipeds	...	29 „	15·5 „
<i>Loc.</i> Off Ceylon 32-34 fms., and off the Andamans, 41 fms.			

Lambrus (Parthenolambrus) tarpeius, Ad. and Wh.

Lambrus tarpeius, Adams and White, 'Samarang' Crust., p. 35, pl. vii. fig. 2.

Lambrus tarpeius, Miers, 'Challenger' Brachyura, p. 99.

Carapace covered with numerous large nodules, and with the division into three lobes—a median and two lateral—well-marked. The hepatic region not only projects very strongly forwards, but is brought into greater prominence by the fact that the carapace is somewhat contracted behind the eyes, and excavated and constricted behind the hepatic regions themselves: the antero-lateral margins are crenulate; the produced postero-lateral angle ends in a rounded lobe-like spine, and the posterior and postero-lateral margins are irregularly and bluntly toothed.

The rostrum, which is deeply excavated and considerably deflexed, ends in a blunt point.

The chelipeds are massive and nodular, but even in the male are only about half as long again as the carapace.

The ambulatory legs have the 3rd, 4th and 5th joints compressed and irregularly dentate along one or both edges.

Our specimens, which are rather damaged, come from the Andamans to 20 fathoms, and from off Colombo, $26\frac{1}{2}$ fathoms.

Lambrus (*Parthenolambrus*) *harpax*, Ad. and Wh.

Lambrus harpax, Adams and White, 'Samarang' Crustacea, p. 25, pl. vi. fig. 3.

Lambrus harpax, Haswell, P. L. S., N. S. Wales, Vol. IV. 1879, p. 450; and Cat. Austral. Crust., p. 32.

Lambrus harpax, Miers, Zoology H. M. S. 'Alert,' pp. 182 and 202; and 'Challenger' Brachyura, p. 99.

Male. Carapace depressed semi-elliptical, as long as broad, its surface almost smooth. The median region is carinated, the carina bifurcating anteriorly to enclose an elongate-triangular depression behind the eyes, and carrying a large spine in the gastric region (at the point of bifurcation), another large spine in the cardiac region, and a much smaller spine in front of the latter.

The lateral margins are cristiform, with a series of crenations and sutures indicating fused teeth; and the hepatic region is prominent, with a cristiform edge: the postero-lateral angle is surmounted by an upturned lacinated tooth, the postero-lateral margins are dentate, and on the posterior border is a triangular tooth with an obscurely trilobed tip: from the bluntly lacinated tooth of the postero-lateral angle a carina runs obliquely forwards and inwards onto the posterior part of the branchial region.

The rostrum is strongly deflexed, and ends in an obscurely and unevenly trilobed tip. The chelipeds in the male are nearly $2\frac{1}{2}$ times the length of the carapace, and are thin and compressed, with sharp, almost cristiform, edges: in the *arm* both the inner and outer edges are unevenly dentate, and the lower edge faintly granular: the *carpus* has the outer edge compressed and crenulate: the thin *hand* has its inner edge crenulate, has a curved line of granules on its inner surface, and some granules on its outer surface: the movable *finger* has its upper edge crenulated at base. The ambulatory legs are compressed, with the 3rd, 4th and 5th joints cristated above, especially in the last two pairs: in the last pair these joints have both margins rather strongly dentated.

Our specimen is from the Andamans.

Miers (Zoology H. M. S. 'Alert,' p. 202) considers *L. sandrockii*,

Haswell (P. L. S., N. S. Wales, Vol. IV. 1879, p. 452, pl. xxvii. fig. 2) to be identical with this species.

PARTHENOPE, Fabr.

Parthenope, Milne-Edw., Hist. Nat. Crust., I. 359, (v. *synon.*)

Parthenope, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 668.

The form and structure of the carapace is somewhat similar to that of *Parthenolambrus*; but the genus is distinguished from *Lambrus* by the nature of the so-called basal antennal joint, which is relatively long, and nearly reaches to the level of the inferior orbital hiatus: the fingers also are much less turned inwards.

Key to the Indian species of the genus Parthenope.

- I. Carapace remarkably rugose or spinose: chelipeds nearly of the ordinary *Lambrus* form, and beset with huge spines: ambulatory legs strongly spinate:—
 1. Carapace and chelipeds beset with coarse tubercles and spines: carapace about $\frac{3}{4}$ as long as broad..... *P. horrida*.
 2. Carapace and chelipeds beset with spines, which are sharp and laciniate on the chelipeds: carapace only $\frac{2}{3}$ as long as broad *P. spinosissima*.
- II. The whole body and all the appendages beset with delicate paxilliform tubercles which unite to form a lace-work or frosting: chelipeds tapering, with long slender spiny fingers, nearly as long as the palm (sub-genus *Parthenomerus*)..... *P. efflorescens*.

Parthenope horrida, Fabr.

Rumph, Amboin. Rariteitk. ix. 1.

? Seba, III. xix. 6-7.

Cancer horridus, Linn. Syst. Nat. II. 1047, 43.

? *Cancer horridus*, Herbst, I. ii. 222, tab. xiv. fig. 88.

Parthenope horrida, Fabr., Suppl., 353.

Parthenope horrida, Leach, Zool. Misc., II. 107.

Parthenope horrida, Desmarest, Consid. Crust., p. 143, pl. xx. fig. 1.

[*Parthenope horrida*, Guérin, Icon. R. A., pl. vii. fig. 1.]

Parthenope horrida, Milne-Edwards, Hist. Nat. Crust., I. 360.

Parthenope horrida, Cuv. Regn. An., pl. xxvi. fig. 2.

Parthenope horrida, A. Milne-Edwards, Nouv. Archiv. du Mus., VIII. 1872, p. 255.

Parthenope horrida, Martens, Archiv. fur Naturges., XXXVIII. 1872, p. 86 (note on habitat).

Parthenope horrida, Miers, Phil. Trans., Vol. 168, p. 486.

Parthenope horrida, Nauck, Z. Wiss. Zool., XXIV. 1880, p. 44 (gastric teeth).

Parthenope horrida, C. & W. S. Aurivillius, Kongl. Sv. Vet. Ak., Handl. XXIII. No. 4, 1888-89, p. 60.

[*Parthenope horrida*, F. Muller, Verh. Ges., Basel., VIII. p. 473].

Carapace somewhat pentagonal; its length not quite $\frac{3}{4}$ its breadth; its surface deeply eroded, strongly rugose, and sharply tubercular: its postero-lateral angle much produced outwards: antero-lateral margin coarsely spinate: postero-lateral and posterior margins granular, the former with a coarse spine. Rostrum short, moderately deflexed, ending in a blunt inter-antennular tooth. Orbits circular, deep.

Chelipeds huge, one much larger than the other, the larger twice the length of the carapace (in the female), covered with large coarse granular spines.

Ambulatory legs stout, spiniferous; the dactylus smooth: the meropodite, in all, is compressed-trigonal, with all the edges spinate.

The under surface of the body has a worm-eaten appearance: the sternum is deeply pitted, with a deep crescentic excavation between the chelipeds.

The abdomen (of the female) with a series of deep excavations along either side.

Off Ceylon, 34 fathoms.

Parthenope spinosissima, A. M.-Edw.

Seba, III. xxii. 2 and 3.

Parthenope spinosissima, A. M.-Edw., in Maillard's l'île Réunion, Annexe F, p. 8, pl. xviii.

Parthenope spinosissima, Alcock, J. A. S. B., 1893, Pt. ii. p. 177.

Carapace in the form of an equilateral triangle, its length only about $\frac{2}{3}$ its breadth; its surface strongly rugose, and sharply tubercular and spinate: the antero-lateral borders are armed with large laciniate spines; the posterior and postero-lateral borders are sharply spinate: the strongly-produced and spinate postero-lateral angle runs forwards as a carina onto the branchial regions.

The three lobes of the gastric region are greatly inflated.

The rostrum is vertically deflexed, and ends in a strong sharp inter-antennular spine.

The chelipeds are very little asymmetrical, and are beset, nearly up to the tips of the fingers, with great ramose and laciniate spines.

The ambulatory legs are armed with extremely sharp teeth almost up to the tip of the dactylus.

The abdomen of the female has a median double series, and on either side a single series, of sharp spines.

A male and female from the Bay of Bengal, 88 fathoms.

Sub-genus PARTHENOMERUS, *nov.*

Characterized by the chelipeds, which have a thigh-shaped meropodite, and taper to the fingers, which are nearly as long as the palm, and are extremely slender.

Parthenope (Parthenomerus) efflorescens, n. sp.

Carapace triangular, not quite $\frac{3}{4}$ as long as broad; its entire surface, above and below, as also that of the sternum, of the abdomen (in the female), and of all the exposed appendages—from the eye-stalks to the last pair of ambulatory legs, covered with a lace-work, or frosting, formed by the partial contact of very delicate crisply paxilliform granules. There are no large tubercles, and, except on the arm hand and fingers, no spines. On the arm, namely, there are two or three teeth with acicular tips, on both the lower-inner, and the upper-inner borders; on the hand there are three needle-like teeth on the upper-inner, and three on the lower-inner borders; and the fingers are everywhere beset with long needle-like spines. The rostrum is nearly vertically deflexed.

Only one cheliped remains in our unique specimen; and it, which is a little over twice the length of the carapace, has a most curious tapering form: the meropodite is huge and thigh-shaped, decreasing in size distally; the carpus is slenderer than the end of the meropodite; and the hand is still slenderer than the carpus: the fingers are long—nearly as long as the palm—are extremely slender, and, as already noted, are beset with long slender spines.

A single female, from the Andaman Sea, 36 fathoms.

CRYPTOPODIA, Edw.

Cryptopodia, Milne-Edwards, Hist. Nat. Crust., I. 360.

Cryptopodia, Miers, Journ. Linn. Soc. (Zool.), XIV. p. 669.

Cryptopodia, Miers, 'Challenger' Brachyura, p. 101.

Carapace very broadly triangular, with very large lateral clypeiiform vaulted expansions which completely conceal the ambulatory legs, and are prolonged posteriorly far beyond the base of the abdomen; a large space between the gastric and the cardiac regions is triangular and concave. The rostrum is nearly horizontal, spatuliform and very prominent. The pterygostomian regions are smooth, not ridged. The orbits are very small, nearly circular, with a suture in the superior margin. The epistome is well developed; the antennular fossæ are narrow and somewhat oblique. The abdomen, in the male, is five-jointed; the third to fifth segments coalescent. The eyes are very small and retractile. The basal antennal joint is slightly dilated and does not nearly reach the internal orbital hiatus, which is filled by the second joint. The buccal cavity and external maxillipeds are small. The ischium-joint of the maxillipeds is not produced at its antero-internal angle; the merus is distally truncated, with the antero-external angle slightly produced, the interior margin notched below the antero-internal angle. The chelipeds are nearly as in *Lambrus*; the merus-joint has a wing-like lobe on the posterior margin near to the distal extremity; the

palms of the chelipeds are elongated, tricarinated, and dentated (as in *Lambrus*); fingers short. The ambulatory legs are slender, decrease successively but slightly in length, and have the fourth, fifth and sixth joints more or less distinctly carinated; dactyli nearly straight.

Cryptopodia fornicata, (Fabr.)

Cancer fornicatus, Fabr., Ent. Syst., II. 453.

Cancer fornicatus, Herbst, I. ii. 204, pl. xiii. figs. 79–80.

Parthenope fornicata, Fabr., Suppl., p. 352.

Maia fornicata, Latr., Hist. Nat. Crust., VI. 104.

Oethra fornicata, Desmarest, Consid. Crust., p. 110.

Cryptopodia fornicata, Milne-Edwards, Hist. Nat. Crust., I. 362 (*v. synonym.*)

Cryptopodia fornicata, de Haan, Faun. Japon. Crust., p. 90, pl. xx. figs. 2 and 2a; and (?) Adams and White, 'Samarang' Crust., p. 32, pl. vi. fig. 4; and Dana, U. S. Expl. Exp. Crust., pt. I. p. 140; and Stimpson, Proc. Ac. Nat. Sci., Philad., 1857. p. 220; and Haswell, P. L. S., N. S. Wales, Vol. IV. 1879, p. 454; and Cat. Austral. Crust., p. 37; and E. Nauck, Z. Wiss. Zool., 1880 (gastric teeth); and Miers, Zool. H.M.S. 'Alert,' pp. 182 and 203; and 'Challenger' Brachyura, p. 102; and A. O. Walker, Journ. Linn. Soc., Zool., Vol. XX. 1890, p. 109; and J. R. Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 351.

Carapace broadly triangular, depressed: the antero-lateral margins more or less laciniated, the posterior and postero-lateral margins forming one strong curve, the edge of which is either unbroken or shows very faint traces of crenulation: the surface of the carapace is in the main smooth, but the triangular depression is a little pitted and is bounded by lines of granules, the lateral lines being produced well across the branchial regions. The rostrum is prominent, blunt-pointed, about as long as broad, and has its edge very faintly crenulate.

The chelipeds are considerably less than twice the length of the carapace, and have massive sharply trigonal joints, with most of the edges strongly cristiform; and the fingers are massive and strongly incurved as in *Lambrus*: in the *arm*, the cristiform inner and outer edges are sharply laciniate, the latter being strongly alate, while the lower edge is beaded: in the *carpus* the outer edge only is cristiform: in the hand both the inner and outer edges are strongly cristiform and laciniate, the lower edge being crenate.

The ambulatory legs have both edges of the merus raised into spiniform crests, and the upper edges of the next two joints carinate.

In the Museum collection are numerous specimens from Palk Straits, Andamans and Persian Gulf.

Cryptopodia angulata, Edw. and Lucas.

Cryptopodia angulata, Edw. and Lucas, Archiv. du Mus., Vol. II. 1841, p. 481, pl. xxviii. figs. 16–19.

Carapace convex, sharply pentagonal, with all the edges deeply

dentated, and all the angles produced to form curved spines; in addition there is a second spine in front of the spine of either antero-lateral angle, and the part of the posterior border that is co-extensive with the abdomen is demarcated on either side by a strong spine. The rostrum ends in a sharp point. The triangular depression of the carapace is very deep, and the lines which bound it are granular; there is an irregular patch of granules on either branchial region, and there is a line of granules passing forwards from the apex of the triangular depression to the base of the rostrum on either side.

The chelipeds are much as in *C. fornicata*, with the exception that the carpus is semi-globular, and that the inner and outer margins both of the hand and arm are armed with sharp lacinate spines. The ambulatory legs have the merus simply carinate above, spinate-carinate below, the carpus and propodite carinate, and the dactylus strongly carinate on both edges so as to form a swimming blade.

Orissa coast, 20–25 fathoms. Malabar coast, 28 fathoms.

In a large male from the Malabar coast, the carapace is much more granular; and the chelipeds have the spinature much more acute and lacinate, and their surfaces—especially the under surface—granular instead of nearly smooth.

Cryptopodia angulata, var. *cippifer*, nov.

In this variety the only differences are: (1) that the semi-globular carpus has a few granules on its upper surface; and (2) that the triangular hollow in the middle of the carapace is rather deeper, and has certain large erect definitely-placed spines on the ridges that bound the hollow, namely,—two close together side by side in the middle line, in front; one at either branchial angle; and one in the middle line posteriorly, on the summit of the cardiac region.

These spines are present in six specimens of both sexes, but are most pronounced in the male.

Loc. Karáchi.

The largest specimen, female, has an extreme breadth of carapace of 45 millim.

HETEROCRYPTA, Stimpson.

Heterocrypta, Stimpson, Ann. Lyc. Nat. Hist., New York, Vol. X. 1874, p. 102.

Heterocrypta, A. Milne-Edwards, Miss. Sci. Mex., Crust., I. p. 166.

Heterocrypta, Miers, J. L. S., Zool., Vol. XIV. 1879, p. 669; and 'Challenger' Brachyura, p. 102.

Differs from *Cryptopodia* in the following characters:—

The posterior border of the carapace slightly overlaps the abdomen, but is not distinctly produced; the lateral clypeiform expansions are also less produced, so that the legs when even moderately extended can be seen beyond them.

The pterygostomian and sub-hepatic regions are traversed by a granular ridge which runs parallel to the antero-lateral border from the angle of the buccal cavity to the base of the chelipeds.

Heterocrypta investigatoris, n. sp.

Carapace broadly pentagonal; the posterior border almost straight, and crenulated; the other borders sharply dentate. The central depression of the carapace is semi-circular and very deep, with the boundary raised into a carina: the horns of the semi-circle end each in a boss or mammillary tubercle, from which a carina runs backwards to the posterior angle of the carapace. The rostrum is very large and prominent, shaped like a leaf: its surface is smooth: that of the carapace is either smooth or granular—the granules, when present, being most abundant on the posterior part of the branchial regions.

The chelipeds, which are twice the length of the carapace, have both the inner and outer edges of the *arm* sharply dentate (but not alate as in *Cryptopodia*), and the lower edge beaded: the *carpus* is subglobular: the *hand* has both the inner and the outer edges bluntly dentate, and the under surface closely covered with bead-like granules.

The ambulatory legs have the upper edges of the 3rd, 4th, and 5th joints sharply carinate: the meropodite also, in the case of the first two pairs of legs, has a single row of teeth or spines along its lower edge, and in the case of the last two pairs of legs has a double row of spines along the lower edge.

Like all the species of this genus, this species is small, the breadth of the carapace in the largest specimen being 18 millim.

It is not uncommon off rocky parts of the coasts of India up to and about 30 fathoms. It would seem to be allied to the *Cryptopodia contracta* of Stimpson (Proc. Ac. Nat. Sci., Philad., 1857, p. 220)..

OETHRA, Leach.

Oethra, Leach.

Oethra, Milne-Edwards, Hist. Nat. Crust., I. 370.

Oethra, A. Milne-Edwards, Miss. Sci. Mex., Crust., I. p. 170 (*v. synonym.*).

Oethra, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 669.

The carapace is regularly oval (transversely), with its surface strongly rugose, and its antero-lateral edges somewhat upturned. The

rostrum is obsolete, not breaking the general oval outline. The eyes are small; and the orbits are nearly circular, with two sutures in the upper border, and a hiatus at the inner inferior angle, which is filled by the second joint of the antennary peduncle.

The antennular fossæ are squarish, and are nearly filled by the large angular basal joint, internal to which the rest of the antennule folds obliquely.

The basal antennal joint is oblong and angular, and reaches to the internal orbital canthus: the antennary flagella are rudimentary.

The external maxillipeds completely close the buccal frame: their inner border is extremely straight and sharp cut: their palp is inserted at the antero-internal angle of the merus, and folds out of sight.

The chelipeds are about equal in length to the carapace: they have somewhat the *Lambrus* form—having sharply prismatic joints and large inturned fingers, but are concave on the upper surface.

The ambulatory legs are short, and decrease gradually in length: they are all strongly dentate-carinate, or cristate.

The abdomen of the female (and young male) consists of seven segments.

Oethra scruposa, L.

[*Cancer scruposus*, Linn., Mus. Lud. Ulr., p. 450.]

Cancer polynome, Herbst, III. ii. 23, tab. liii. figs. 4-5.

[*Oethra depressa*, Lamk., Hist. Anim. Sans. Vert., V. 265.]

Oethra depressa, Desmarest, Consid. Crust., p. 110, pl. x. fig. 2.

[*Oethra depressa*, Guérin, Icon. R. A., pl. xii. fig. 3.]

Oethra scruposa, Milne-Edwards, Hist. Nat. Crust., I. 371.

Oethra scruposa, Cuv., R. A., pl. xxxviii. fig. 2.

Oethra scruposa, Stimpson, Proc. Ac. Nat. Sci., Philad., 1857, p. 221.

Oethra scruposa, A. M.-Edw., in Maillard's l'île Réunion, Annexe F., p. 3; and Nouv. Archiv. du Mus., VIII. 1872, p. 263.

Oethra scruposa, Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 351.

[*Oethra scruposa*, F. Muller, Verh. Ges., Basel, VIII. 473.]

(*Oethra scruposa*, var. *scutata* A. Milne-Edwards, Miss. Sci. Mex., Crust., I. p. 170, pl. xxxi. fig. 2 = *Oethra scutata*, S. I. Smith, Amer. Journ. Sci., etc., XLVIII. 1869, p. 120; and Ann. Mag. Nat. Hist., 1869, Vol. IV. p. 230, is considered by M. A. Milne-Edwards to be only a variety of the Linnæan type.)

The antero-lateral borders are divided into 6 or 7 indistinct lobes by deep narrow sutures, each fold being again subdivided near the edge by a faint crest.

The gastric region is extremely prominent, and is divided into two lobes by a broad longitudinal channel, each lobe being sparsely granular: the branchial regions are also somewhat convex near their middle, the

convexities being granular: the rest of the carapace is somewhat concave.

The chelipeds and ambulatory legs are rough: the chelipeds have the lower edge sharply dentate, and the outer edge of the carpus sharply dentate: the ambulatory legs have the 3rd, 4th and 5th joints carinate or cristate above, and the 3rd and 5th joints cristate below: the dactyli are cristate on both edges, and end in little claws.

The abdomen is deeply sculptured.

In the Museum collection is a male from the Andamans, and a female from Ceylon.

Sub-family II. EUMEDONINÆ, Miers.

Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 670.

Carapace rhomboidal or pentagonal, with a spine at the junction of the antero-lateral and postero-lateral borders. Rostrum usually bifid or emarginate. Surface of carapace nearly flat. Chelipeds of moderate size and length.

Key to the Indian genera of the sub-family EUMEDONINÆ.

- I. Floor of the orbit not in contact with the front, but leaving a hiatus which is more or less filled by the second joint of the antennal peduncle. Chelipeds armed with large spines: ambulatory legs compressed:—
 1. Spine of antero-lateral angle of carapace directed forwards..... ZEBRIDA.
 2. Spine of antero-lateral angle directed straight outwards; last pair of legs dorsal in position... EUMEDONUS.
- II. Floor of the orbit meeting the front, so as to completely exclude the antennal peduncle from the orbit: chelipeds not armed: ambulatory legs not compressed..... CERATOCARCINUS.

ZEBRIDA, Adams and White.

Zebrida, Adams and White, 'Samarang' Crustacea, p. 23.

Zebrida, Miers, J. L. S., Zool., Vol. XIV. 1879, p. 670.

Carapace sub-rhomboidal, flattened, with the rostrum formed by two large, acute, laminar, almost parallel teeth; and with the antero-lateral angles produced to form two similar laminar teeth projecting forwards in a plane parallel to the rostrum.

Orbits circular, their inner canthus being filled by part of the antennal peduncle.

The antennules fold obliquely. The antennæ are entirely concealed beneath the rostrum: their flagellum is well developed; and their basal joint is longish, reaching to the inner canthus of the orbit.

The chelipeds are stout but short, the legs are compressed, and both are armed with large laminar spines of the same type as those that form the rostrum and the antero-lateral margins of the carapace. The ambulatory legs are subchelate much as in *Acanthonyx*.

Zebrida adamsii, White.

Zebrida adamsii, White, P. Z. S., 1847, p. 121; and Ann. Mag. Nat. Hist., 1848, Vol. I. p. 223; and 'Samarang' Crustacea, p. 24, pl. vii. fig. 1.

Zebrida adamsii, J. R. Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 351.

Zebrida longispina, Haswell, P. L. S., N. S. Wales, Vol. IV. 1879, p. 454, pl. xxvii. fig. 3; and Cat. Austral. Crust., p. 38.

Body of a light delicate madder pink, the carapace with darker (liver-coloured) parallel longitudinal bands and alternating streaks, the legs and chelipeds with broad somewhat oblique cross-bands of the same darker colour: the median longitudinal dark band, and a band on either side of it, extend, discontinuously, from the carapace along the abdomen.

The entire integument of the body and limbs is smooth, hard, and polished. The chelipeds are stout, with short squat joints: the *arm* is trigonal with sharp-cut laminar edges, the upper and lower of which end in sharp teeth; its broad distal end is also dentate: the *wrist* is surmounted by three laminar teeth disposed in a triangle: the *hand* has its upper edge raised into a compressed tooth.

Of the ambulatory legs the 3rd, 4th, and 5th joints are strongly compressed, with the upper edges sharply and acuminate carinate; the fifth joint is enlarged distally, and the strongly recurved dactylus is retractile against it in the manner of a subchela.

In the Museum collection are a male and female from the coast of Travancore.

EUMEDONUS, Edw.

Eumedonus, Edw., Hist. Nat. Crust., I. 349.

Eumedonus, Miers, J. L. S., Zool., Vol. XIV. 1879, p. 670.

Carapace depressed, pentagonal: rostrum large, strongly prominent, bifurcate only near the tip. Orbits circular; their internal hiatus occupied by part of the antennal peduncle. Antennules folding obliquely; their basal joint of large size.

Antennæ entirely concealed beneath the front; both the peduncle and the flagellum short. Chelipeds more massive than the other legs, and in the male much longer; armed with large spines. Ambulatory legs compressed; their third joint cristate; the second pair a little shorter than the third; the fifth pair dorsal in position. The abdomen in both sexes consists of seven separate segments.

Eumedonus zebra, n. sp.

Carapace, in spirit, of a yellow colour, and traversed fore-and-aft by five broad parallel liver-coloured bands—a median and two lateral: the median and the inner lateral band on either side being continued a certain distance on to the abdomen.

The carapace is sharply pentagonal, the antero-lateral angles being sharp and directed straight outwards.

The rostrum forms a long, broad, sub-triangular lamina bifurcated near the tip.

The chelipeds in the female are about the same length as the carapace: the ischium has a sharp tooth on its inner border, the merus has one on its inner and one on its upper margin, the carpus has a very strong one on its upper border, and the hand has two on its upper border: the legs have the merus strongly compressed, with the upper border dentate or cristate, and the dactyli are strongly recurved.

Two ovigerous females from off Ceylon, 32 fms: the extreme length of the carapace of the larger specimen is 10 millim.

CERATOCARCINUS, Adams and White.

Ceratocarcinus, Adams and White, Proc. Zool. Soc., p. 57, 1847; and 'Samarang' Crust., p. 33.

Ceratocarcinus, Miers, Journ. Linn. Soc., (Zool.) XIV. p. 670, 1879; and 'Challenger' Brachyura, p. 104.

Carapace sub-hexagonal, about as broad as long, with the dorsal surface nearly flat, spinose or tuberculated. The spines of the rostrum are elongated, acute, and separated by a rather wide interspace, and there is a well-developed lateral epibranchial spine. The orbits are small and circular, and the sub-ocular lobe joins the front, so as completely to exclude the antennæ from the orbits. The basal joint of the antennæ is slender and like the greater part of these appendages is hidden beneath the front. The external maxillipeds are small, the ischium-joint not produced at its antero-internal angle, the merus distally truncated, not produced at the antero-external angle, and scarcely emarginate at the antero-internal angle, where the next joint articulates. The chelipeds are relatively slender and somewhat elongated, with the joints not dilated, the merus and carpus sometimes armed with spines; the dactyli acute and shorter than the palms; the ambulatory legs are slender, with the joints not dilated, the merus sometimes armed with a distal spine; the dactyli nearly straight.

Ceratocarcinus longimanus, Ad. and Wh.

Ceratocarcinus longimanus, White, P. Z. S., 1847, p. 57; and Ann. Mag. Nat. Hist., 1847, Vol. XX. p. 62; and 'Samarang' Crustacea, p. 34, pl. vi. fig. 6.

Ceratocarcinus longimanus, Miers, 'Challenger' Brachyura, p. 105.

Carapace hexagonal: the spines of the rostrum far apart: lateral angles of the carapace in the form of stout outstanding spines the tips of which are turned forwards: a pair of sharp tubercles in the middle line behind the rostrum—these being tufted with hairs.

Chelipeds stout, about twice the length of the carapace and rostrum, finely granular, and longitudinally grooved.

A single specimen of this small species, from the Malacca Straits, is in the Museum Collection.

Appendix to sub-family ACANTHONYCHINÆ.

MENÆTHIOPS, n. gen.

Closely allied to *Menæthius*.

Carapace pyriform, its surface smooth beneath a pubescent covering. The rostrum consists of two acute slender spines of moderate length, which are in the closest contact throughout.

The eyes, which are movable forwards but not retractile, are in great part concealed beneath a large, very conspicuous, laminar supra-ocular spine. No post-ocular spine. [A spinule is present on the ventral aspect of the hepatic region of the single species.] The basal antennal joint is broad; and the mobile portions of the antennæ are visible, from above, on either side of the rostrum.

The external maxillipeds have the merus as broad as the ischium, and the palp inserted at the antero-internal angle of the merus.

The ambulatory legs, of which the first pair are longer than the rest, have strongly recurved prehensile dactyli.

The chelipeds in the female (male unknown) are not enlarged.

The abdominal segments in the female appear to be all distinct.

This genus has a superficial resemblance to *Oregonia*, Dana; but in *Oregonia* there is a large post-ocular spine, quite distinct from the hepatic angle, and the eyes are said to be retractile against this spine.

Menæthiops bicornis, n. sp.

Body and legs tomentose, with additional long scattered setæ.

Carapace pyriform, somewhat *Achæus*-like in shape, there being a slight constriction behind the eyes, and another slight constriction behind the hepatic regions: the gastric and cardiac regions very prominent, the branchial regions prominent: the surface, when denuded, smooth, except for a granular ridge on the pterygostomian regions; the hepatic regions are laterally rather prominent, and carry a small spinule

visible from above, on the ventral aspect of the antero-external angle, as well as a much smaller spinule on the dorsal aspect. There is also a spinule, in the middle line, on the gastric region, and one on the cardiac region, as well as one near the middle of either branchial region.

The rostrum consists of two slender acute spines, which are about one-fourth the length of the carapace proper, and are in the closest contact up to the very tips.

The eyes are movable forwards but are quite non-retractile backwards, and are in great part concealed beneath a large laminar supra-ocular spine, which has its anterior angle produced forwards and its posterior angle produced outwards. No post-ocular spine.

[The spinule on the ventral surface of the hepatic angle is in no sense a post-ocular spine.]

The basal antennal joint is broad and has its outer edge irregularly wavy, somewhat as in Dana's figure of *Oregonia gracilis* (U. S. Expl. Exp., Crust., I. pl. iii, fig. 2b.); its sharp antero-external angle is, like the following joints and the flagellum, plainly visible, from above, beside the rostrum: the mobile portion of the antenna is rather more than half the length of the carapace and rostrum.

The chelipeds in the female are not stouter than the other legs, and are shorter than the carapace and rostrum: their palm is nearly twice the length of the fingers, which meet only at the tip.

The ambulatory legs all have slender joints and a strongly recurved prehensile dactylus: the first pair, which are the longest, are, in the female, a little longer than the carapace and rostrum.

A single egg-laden female has the following dimensions:—

Length of carapace and rostrum	...	...	6·2 + 2 = 8·2	millim.
Greatest breadth of carapace	...	...	6·0	„
Length of chelipeds	...	...	7·0	„
Length of first ambulatory legs	...	...	8·5	„

Loc. Káráchi.

The place of the above genus in the “Key to the Indian genera of the sub-family *Acanthonychinæ*” (pp. 190 and 191 *ante*), is with *Huenia* and *Menæthius*, from both of which it is easily diagnosed (1) by the *Pisa*-like rostrum, consisting of two sharp slender spines in the closest contact throughout their extent, and (2) by the large antennary flagellum and by the eroded outer edge of the basal antennal joint. It has, indeed, the closest natural relations with *Menæthius*.

The unique specimen has only just been received along with the “Investigator” collections of the season 1894-95.

EXPLANATION OF PLATES.

PLATE III.

- Fig. 1. *Lambrachæus remifer*, ♂.
 „ 2. *Physachæus ctenurus*, ♂; 2a. abdomen of ♀ × 4; 2b. abdomen of ♂ × 4.
 „ 3. *Physachæus tonsor*, ♀
 „ 4. 4a. *Grypachæus hyalinus*, ♀.

PLATE IV.

- Fig. 1. 1a. *Inachoides dolichorhynchus*, ♂.
 „ 2. 2a. *Apocremnus indicus*, ♂.
 „ 3. *Naxia investigatoris*, ♂.
 „ 4. *Macrocoeloma nummifer*, ♂.
 „ 5. *Maia gibba*, ♂.

PLATE V.

- Fig. 1. *Achæus cadelli*, ♂.
 „ 2. 2a. *Chorilibinia andamanica*.
 „ 3. *Callodes malabaricus*, ♀.
 „ 4. 4a. *Paratymolus hastatus*, ♀.

On Polarisation of Electric Rays by Double Refracting Crystals.—By PROF.
 J. C. BOSE, B.A., (CANTAB.) B. SC. (LOND.)

[Read 1st May.]

Plate VI.

A ray of ordinary light incident on a crystal of Iceland spar is generally bifurcated after transmission, and the two emergent rays are found polarised in planes at right angles to each other. The object of the present inquiry is to find natural substances which would polarise the transmitted electrical ray. It was thought that the analogy between electric radiation and light would be rendered more complete, if the classes of substance which polarise light were also found to polarise the electric ray. The identity of the two phenomena may be regarded as established, if the same specimen is found to polarise both the luminous and electric rays.

As the wave length of an electrical ray is very large compared with that of visible light, one would think very large crystals, much larger than what occur in nature, would be required to show polarisation of electric rays. By working with electric radiations having very

short wave lengths, I have succeeded in obtaining very satisfactory results with crystals of moderate size. These experiments show that certain crystals are double refracting as regards electric rays, and that they polarise the transmitted beam. With the help of a rudely constructed apparatus, I was able last year to detect traces of these effects. The apparatus has since been improved in detail; it is now possible to detect the polarisation effects with certainty.

The usual optical method of detecting the bi-refrangent action of crystals, is to interpose the double refracting structure between two crossed Nicols. The interposition of the crystal generally brightens the dark field. This is known as the depolarising effect, and is regarded as a delicate test for double refracting substances. There is however, no depolarising effect, when the principal plane of the crystal coincides with the polarisation planes of either the polariser or analyser. The field also remains dark, when the optical axis of the crystal is parallel to the incident ray.

A similar method was adopted for experimenting with polarised electric radiation. The electric ray is first polarised by a wire grating. A similar grating acts as an analyser. The two gratings are crossed, and the crystal to be examined is interposed. The Receiver is a modified form of 'Coherer' with its associated Voltaic cell and Galvanometer. Brightening of the field is indicated by a throw of the Galvanometer needle.

APPARATUS USED.

Radiator.—A small Ruhmkorff's coil is used for the production of oscillatory discharges between two small metallic spheres, the diameter of each sphere being 1.5 c. m. The choice of a coil to produce electric oscillation has been a matter of necessity. I obtained oscillatory effects with ease and certainty by using a small influence machine of the Replenisher type. But in the damp atmosphere of Calcutta, the satisfactory working of such a machine is a matter of great difficulty, at least for the greater portion of the year. I had therefore to abandon the influence machine with regret, and to use a Ruhmkorff's coil instead. This coil caused me the greatest trouble. The discharge would of a sudden cease to be oscillatory; after a great deal of coaxing it would work satisfactorily just for a short time. The only coil I could get, was a badly constructed one, with defective insulation. I made it serviceable by changing the condenser and improving the vibrator. By looking to many points of detail I succeeded in making the apparatus work with fair uniformity for several hours. It must be borne in mind that the Receiving apparatus also requires careful adjustment.

Among the possible causes of unsteadiness may be mentioned the following—

1st. The current actuating the coil may vary after a time. To overcome this difficulty a fairly constant battery was made to charge a small storage cell, and a derived circuit from this cell was led to the Primary coil.

2nd. The interrupter may have its rate of vibration changed by heating, wearing out of contact points, and other causes. Any change in the periodicity of the vibrator is at once made evident by the corresponding change in the pitch of the note given out by the vibrator.

3rd. The sparking balls may have their surfaces roughened by the disintegrating action of the spark. To avoid this difficulty, the balls were thickly coated with deposit of gold, and were turned round at intervals to expose fresh surfaces.

The coil with a storage cell is enclosed, with the exception of a horizontal tubular opening, inside a metallic box, not dissimilar in appearance to an Optical Lantern. The interrupter is actuated by turning a key from outside. The sparking balls are at one end of a brass tube 25 c.m. long and 5 c.m. in diameter. At the further end of the tube is the Polariser. Inside the tube is placed a convex lens with the spark gap at its principal focus. With the help of the lens and suitable diaphragms, the electrical beam is made approximately parallel. By means of an Iris diaphragm, the amount of radiation may be varied.

Polariser.—The success of the experiment depends greatly on the care with which the Polariser and Analyser are constructed. Fine copper wire 2 m. m. in diameter is carefully wound in parallel lines, round two thin sheets of mica. There are about 25 lines for every centimetre. The mica pieces are then immersed in melted paraffin, and the wires thus fixed *in situ*. By cutting round, two circular pieces, containing the gratings are obtained. The mica pieces are too thin to produce any disturbing effect. The gratings are fixed with wires parallel, at the ends of a tube 5 c.m. long. This Polariser tube rotates inside the outer end of the tube which sends out the parallel electric beam.

Analyser.—The Analyser is similar in construction to the Polariser. It rotates inside the Receiving tube, which contains the sensitive surface for detecting radiation.

Receiver.—The Receiving apparatus consists of a 'Coherer' with a Voltaic cell and Galvanometer in series. The Coherer is modified from its usual tubular form. The filings, a single layer thick, are spread over a large surface. This arrangement secures great sensitiveness. A pair of insulated wires from the ends of the Coherer, are led out to a distant dead-beat Galvanometer of D'Arsonval type in series with a constant

cell. The leading wires are shielded from radiation by enclosing them inside two coatings of tin foil, along the whole length. As an additional precaution the Galvanometer is also enclosed in a metallic case, with a slit in front of the Galvanometer mirror. A spot of light reflected from the mirror is received on a scale. By adjusting the electromotive force of the circuit, the sensitiveness may be increased to any extent desirable.

When the Analyser and Polariser are properly constructed, and the two exactly crossed, no radiation will reach the sensitive surface, and the Galvanometer will remain unaffected. The field is then said to be dark. But any slight rotation of either Polariser or Analyser, will partially restore the field, and the spot of light will sweep across the scale.

METHOD OF EXPERIMENT.

The spark gap 2 m.m. in length is adjusted in a line inclined at 45° to the horizon. The wires of the Polariser are placed at right angles to this line. The transmitted beam is then plane polarised, its plane of vibration being inclined at 45° to the horizon. The Analyser is now adjusted in a crossed position. On starting the electric vibration, by closing the Ruhmkorff's coil circuit, the Galvanometer remains unaffected. The crystal to be examined is now interposed with its principal plane vertical.

The Geological Department of India kindly lent me a large number of crystals for examination, for which I have to express my thanks. Out of a large number of experiments, I give below an account of some typical cases.

Rhombohedral System.—1° *Beryl*.—The first piece experimented on was a large crystal of Beryl. It is a Hexagonal prism with basal planes. The specimen examined has each face 11×5 c.m. The three axes lying in the same plane are inclined at 60° to each other, the fourth axis which is also the optical axis, is at right angles to the plane containing the other three. This crystal was optically opaque.

On interposing this block with its principal plane vertical, the Galvanometer spot flew off the scale. The crystal had thus produced the well known depolarising action. The crystal was now gradually inclined till its principal plane coincided with the polarising plane of the Polariser. There was now no action on the Galvanometer. On continuing the rotation the Galvanometer at once responded. The spot became quiescent a second time, when the principal plane coincided with the polarisation plane of the analyser.

The crystal was now placed with its optic axis parallel to the direction of the incident ray. There was no action on the Galvanometer. Rotation of the crystal round this axis, did not produce any effect on the Galvanometer. The field continued to be dark.

2° *Apatite*.—This specimen exhibited decided double refraction.

3° *Nemalite*.—This is a fibrous variety of Brucite. This specimen exhibited a very strong depolarisation effect. It also exhibited certain interesting peculiarities which will form the subject of a future communication.

Rhombic system.—A large piece of Barytes was found strongly double refracting.

Triclinic system.—Microcline, a greenish blue crystal of the double oblique type, exhibited polarisation effect to a remarkable degree.

Regular system.—A large crystal of Rock-salt was taken. This as was expected did not produce any effect.

Having satisfied myself of the fact that systems of crystals other than regular, produce double refraction and consequent polarisation of electrical ray, I tried the action of electric radiation on crystals ordinarily used in optical experiments.

I got a fairly large piece of black Tourmaline. On interposing this with its plane vertical, there was prompt movement of the spot of light. There was no action on the Galvanometer, when the principal plane coincided with the planes of polarisation of either the Polariser or Analyser.

With ordinary light a piece of Tourmaline of sufficient thickness absorbs the ordinary, but transmits the extraordinary ray. With the piece of Tourmaline used in the last experiment I found both the rays transmitted, but, it seemed to me, with unequal intensities. In other words, one ray suffers greater absorption than the other. It seems probable that with greater thickness of crystal one ray would be completely absorbed. I found other crystals behaving more or less in the same way. I reserve for another communication particulars of experiments bearing on this subject.

Lastly I tried an experiment with a crystal of Iceland spar, taken out of a Polarising apparatus. With this I got distinct depolarising action.

The above results, with the exception of the last, were obtained with uncut specimens. Their faces were often rough and irregular. Better results, were they needed, could no doubt be obtained by judicious cutting and polishing the faces.

Summary.—It will thus be seen that crystals which do not belong to the Regular system, polarise the electric ray, just in the same way as they do a ray of ordinary light. Theoretically all crystals, with the

exception of those belonging to the Regular system, ought to polarise light. But this could not be verified in the case of crystals opaque to light. There is no such difficulty with electric rays, for all crystals are transparent to them. As a matter of fact, all the above experiments with one exception were performed with specimens opaque to light.

Explanation of the plate

R...metallic box containing the Ruhmkorff's coil.

S...position of the sparking balls.

L...position of the convex Lens.

P...the Polariser.

I...Iris diaphragm.

K...the Crystal.

A...the Analyser.

C...the Coherer.

G...the Galvanometer. In practice the Galvanometer is placed at a greater distance and the leading wires enclosed in tin-foil.

Description of a New Species of Oxyrhynch Crab of the Genus Parthenope.

—By A. ALCOCK, M. B., C. M. Z. S., Superintendent of
the Indian Museum.

[Read 3rd July.]

The species here described is a true *Parthenope* as delimited by Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 668.

· *PARTHENOPE INVESTIGATORIS*, n. sp.

Carapace almost equilaterally triangular, the sides very slightly curved: its surface is deeply eroded and rugose as in *P. horrida* and *spinosissima*, but is almost devoid of the sharp tubercles found in those species: the antero-lateral borders are slightly crenulate: the produced postero-lateral angle is rounded and nearly smooth: the posterior border bears five small eroded lobules—a very small one in the middle line, with two larger ones on either side—with intervening granules. The gastric region is enormously inflated as in *P. spinosissima*, and descends almost vertically to the vertically deflexed rostrum, the latter being fused with the interantennulary-

tooth. The hepatic regions are rounded laterally, not strongly angulated as they are in *P. horrida* and *spinosissima*. The external maxillipeds, when closed, have the inner edges in the closest contact throughout.

The chelipeds have the *merus* very short and squat——its breadth about two-thirds of its length——with two compressed teeth on its short anterior (inner) border, a few blunt teeth followed by a blunt lobe on its posterior (outer) border, a strong tubercle in the middle of its upper surface, and numerous pearly tubercles and nodules on its lower surface: the *carpus* is granular and pustular: the *hand* has five sharp almost equal sized teeth on the lower border (two of them being on the immobile finger), several large nodules on the outer surface, and several large unequal sized spiny lobules on its inner surface: the *mobile finger* is spiny.

The ambulatory legs are compressed: the *merus* is compressed-trigonal, with the edges, especially the anterior edge, spiny: the *carpus* is indistinctly nodular: the *propodus* is also slightly nodular, with a few spinules on its posterior margin: the *dactylus* is closely covered with spinules up to its tip.

The sternum, in the female, is excavated between the chelipeds.

The abdominal terga, in the female, are raised into strong quadrangular convexities down the middle line, and on either side near the edge.

Loc.—Pedro Shoal, ? depth; and Laccadives, 28 fms.

Length of carapace of largest specimen (female) 45 millim., greatest breadth 61 millim.

The position of the above species in the *key to the Indian species of the genus Parthenope*, page 279 *ante* is thus shown:—

I. Carapace remarkably rugose (or spinose); chelipeds of the ordinary *Lambrus* form:—

1. Carapace somewhat pentagonal, not vertically deflexed from the front of the gastric region: abdominal terga of the female with a series of large eroded pits down either side..... *P. horrida*.
2. Carapace somewhat equilaterally triangular, vertically deflexed from the front of the gastric region: abdominal terga of the female with a series of convexities or nodules down the middle line, and on either side—
 - i. Edges of carapace very strongly spinate: carpus of chelipeds and of ambulatory legs (like all the other parts of the body) strongly spinate: abdominal convexities of female spinate..... *P. spinosissima*.

- ii. Spinature very little developed : edges of carapace crenulate : carpus of chelipeds and of ambulatory legs granular or nodular : abdominal convexities of female not spinate *P. investigatoris*
- II. The whole body and all the appendages beset with delicate paxilliform tubercles which unite to form a lace-work or frosting : chelipeds tapering, with long slender spiny fingers which are nearly as long as the palm *P. (Parthenomerus) efflorescens.*

The present species, as well as *P. efflorescens*, have been figured for next year's issue (1896) of "Illustrations of the Zoology of the R.I.M.S. 'Investigator'."

ERRATUM.

No. 3. Notes on Indian Land Mollusca.

Part II. No. 2, 1895, page 155, 10 lines from the bottom.

“ Hygroucia ” *should be* “ Hygromia.”

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No. III.—1895.

A contribution to the History of Artificial Immunity.—By SURGEON-
LIEUTENANT-COLONEL GEORGE RANKING, M.D.

[Read August, 7th.]

In these modern times when so much advance is being made in medicine, in the direction of the establishment of immunity against various toxic principles by the gradual habituation of the system to increasing doses of the virus, and then utilising the serum of the blood of animals in whom immunity has thus been established, for the “Vaccination” as it is conveniently termed of other non-protected animals, in many cases with complete success, it is not unworthy of us to enquire whether this is a newly discovered principle or whether it is merely a revival or development of a principle known to former ages.

The latest development of the principle of *antitoxine* immunity is the application of the method by which their presence in the serum is ensured, to snake poisoning.

Dr. Fraser of Edinburgh has found a means of so modifying the tissues of a non-protected animal, by gradually accustoming the organism to increasing doses of snake venom, that it not only exhibits certain resistance to even fifty times the minimum lethal dose, but also that the serum of the blood of these immune animals acquires the property of acting as an antidote to the snake poison in other animals. To procure this condition of the blood the usual method is to inject the venom subcutaneously, but Dr. Fraser has also succeeded in immunising cats by the administration of cobra venom by the stomach, and it is this special fact which has led me to the consideration of the

methods in use centuries ago for this same purpose: that is to say, for the prevention or cure of poisoning by snake venom.

We know that centuries ago (about 450 B. C.,) Herodotus wrote about a people named the Psylli (ψύλλοι) living on the shores of the Greater Syrtis who were said to be masters of a secret art enabling them to secure themselves against the bites of venomous snakes. Another people, the Marsi of Central Italy, are said to have possessed the power of so charming venomous reptiles as to render them innocuous. This power, though chiefly exercised by their priests, is said to have been possessed in common by the whole nation. Thus Virgil (*Æn.* vii. 750) writes:—

Quin et Marrubiâ venit de gente sacerdos
Fronde super galeam et felici comtus olivâ
Archippi regis missu, fortissimus Umbro :
Vipereo generi, et graviter spirantibus hydrys
Spargere qui somnos, cantuque manuque solebat,
Mulcebat que iras, et morsus arte levabat.

Even at the present day their descendants are to be found in and about Naples, who as itinerant snake charmers, claim to have inherited the same occult powers as their ancestors.

The Hawwás or Háwís of modern Egypt, also lay claim to these same powers, so that although it has rather been the custom to regard this class of people as charlatans and their claims as absurd, it is, in view of the recent results obtained by Dr. Fraser, of no little interest to examine a little more closely and try to obtain a clue to the methods pursued in various ages to procure immunity against snake poison.

As a slight contribution to this I propose to put forward a fact which has perhaps not received the attention it deserves, though it is well known. I allude to an ingredient of the celebrated *ترباق* or Snake-antidote of Persia.

The composition of this famous antidote is ascribed to Ferídún, king of the Peshdádian dynasty of Persia. The Arab historians however assert that the best *ترباق* the *ترباق فاروق* “the selective antidote” was that of ‘Irâq or Baghdád, and that the *Khalífah* Al Mutawakkil (232–247 A.H.) was in possession of a *ترباق* of such approved virtue that he was in the habit of causing people to be bitten by venomous serpents, so that he might display the properties of his antidote which cured the sufferers on the spot. The proverb in Persian:

تا ترباق از عراق آورده شود مارگزیده مرده بود

While the tiryâq is being fetched from ‘Irâq the snake bitten victim becomes a corpse.

is of constant application to remedies applied too late.

There can be no doubt that this **ترياق** acquired a great reputation as a certain remedy for snake bite, and although its virtues may have been exaggerated, there is no reason for attributing to it the quality of uselessness, so that it really amounts to this, that the ancients were undoubtedly in possession of a means of counteracting the poison of venomous snakes.

Up to the present our position has been very different, in spite of all the labour which has been expended we have never as yet in modern times, at least, so far as the history of medical science goes, possessed a reliable remedy for snake bite. The effectual bite of a venomous snake has meant certain death. Our greatest authority, Sir Joseph Fayrer, states that after long and repeated observations in India and subsequently in England, he has been forced to the conclusion that all the remedies hitherto regarded as antidotes to snake poison are absolutely without specific effect upon the condition produced by the poison.

If then the ancients had so much the better of us, it is worth our while to find what clue to the solution of the problem we can gain from their practice.

The statements regarding the constitution of this famous **ترياق** are very few and very vague.

But I have happened in the course of reading to light upon a passage in an Old Arabic MS. in the library of the College of Fort William, which throws a most interesting light upon the subject, and tends to corroborate the results obtained by Dr. Fraser. The passage I refer to runs as follows:—I quote it in full though the part referring to the etymology of the word **ترياق** is common knowledge—

[The quotation is from a MS. (No. 194.) called **بحر الجواهر** (*Ocean of Pearls*) of date 937 H. (1530 A.D.) the author being Muḥammad ibn-Yūsuf, the physician, of Herát. The MS. bears date 1114 H. (1702 A.D.) according to the colophon it is the work of one Háfiz Muḥammad Husain ibn-Háfiz 'Alí who copied it for his own use. The place where he copied it is not stated.]

“The word **ترياق**” writes our author “is a Greek word derived from the word **تريوق** which is the name given to that which is venomous among animals, such for instance, as vipers and similar serpents. It is said that the **ترياق** (*tiryáq*) is only so called after the flesh of vipers has been cast into it, and then only because the viper is one of the venomous class of animals. One of the learned doctors states that the word **ترياق** is derived in the Greek language from the name given to biting animals (**ذوات النهوش**) and venomous animals (**ذوات السموم**)

which in their language are called *تريوق*¹ and also from the name of the medicine for fatal poisons, because this medicine is of use for all those kinds of poison. Accordingly it was named *ترياق*. The Arabs corrected this and called it *الترياق*. (*The antidote κατ' ἐξοχήν.*) The Táj² states that it is only called *ترياق* because it contains the slaver (venom) of serpents (*ريق السحيات*). Al Jauharí says, "The word *ترياق* is an Arabicised Persian word meaning an antidote for poisons, the Arabs call wine *ترياق* because it dispels grief," and in the *Talkhís*³ it is called *الترياق* Al-taryáq (with fatha) and *ترياق الفارق* Taryáq al Farúq *the selective (or discriminating) antidote*; also *ترياق الافاعي* Tiryáq al Afá'í and *ترياق الاكبر* Tiryáq ul Akbar, *the chief antidote*. This is that which restores the spirit of one who is suffering from the effects of poisonous drugs, to its normal condition. It takes four years in its preparation, and must not be used before that time has elapsed; it lasts from four to thirty years: the freshly prepared is efficacious in all cases, but in from thirty years to sixty years it becomes old and weak. The old *ترياق* resembles an old man, and the freshly prepared is like the youth.

The *ترياق الاربع* (*tiryáq ul arba'*) is compounded of four ingredients.

The *ترياق الثمانية* (*tiryáq ul Samániya*) is compounded of eight ingredients and is far more efficacious than the *ترياق الاربع* (*tiryáq ul arba'*).

The *ترياق المجانين* (*tiryáq ul majánín*) is the name given to the flesh of hedgehogs, because it is good for sufferers from epilepsy and melancholia."

As to the other ingredients of this *ترياق* we have little or no information. Lane in his Lexicon states, that it contained "the best sort of Jew's pitch," i.e., asphaltum, also called *موميا* *múmiá*: but the mere fact that the presence of either the flesh of vipers or their venom was indispensable shews that this was looked upon as the active ingredient, and it certainly appears that the administration of serpent venom as a means of establishing immunity against the bite of venomous snakes was known centuries ago.

¹ *تريون* *θηριον* (?)

² *تاج العروس* date 709 H.

(H. K.)

³ *Talkhís fil Lughat*, by Abu Hilál Hasan ibn-Abdullah Askerí, died 395 H.

(H. K.)

Noviciæ Indicæ IX. *Some additional Papaveraceæ.*—By D. PRAIN.

[Read August, 7th.]

The account of this natural order in the *Flora of British India* (i. 116–119) was published 23 years ago (May 1872). Since that date a number of forms new to the Indian area have been communicated to the Calcutta Herbarium from the various frontiers of the Empire. Some of these require to be added to the Indian Flora, not because they were unknown when the first volume of the *Flora of British India* was published—a few of them as a matter of fact are included in the *Flora Indica* published by Drs. Hooker and Thomson in 1855, which included in its purview the area beyond the north-west frontier comprising Beluchistan and Afghanistan that is excluded from the scope of the later work—but owing to extension of Indian territory towards the north-west during the past quarter of a century. In the present paper it is proposed to provide diagnoses of those forms in as nearly as may be the style of the diagnoses in the *Flora of British India*; to obviate the possibility of confusion between the forms now described and those given in the *Flora*, keys have been prepared showing the relationships of *all* the Indian species in each genus.

To assure himself of the probable validity of the species here proposed as new, and of the accuracy of the nomenclature of those previously described, the writer has compared examples of each with the material of the order contained in a number of European collections. He has also had the advantage of the use of the material in Herb. Saharanpur kindly placed at his disposal by Mr. Duthie, that in Herb. Zürich kindly lent by his friend Prof. Schinz and that in the private collection of Mr. C. B. Clarke kindly lent by its owner. For facilities in consulting the public Herbaria at Kew, the British Museum, Paris and Geneva, the writer has to thank Mr. Dyer, Mr. Carruthers, M. Ed. Bureau, and Dr. J. Mueller respectively; while for permission to study the material in their magnificent private collections, he is deeply indebted to M. Casimir de Candolle and M. Barbey-Boissier of Geneva, and to M. Drake del Castillo of Paris. And for assistance and advice most ungrudgingly given during his study of these Indian species, the writer would wish to thank many friends, but more especially M. Casimir de Candolle, Geneva; M. Ad. Franchet, Paris; Dr. Batalin, St. Petersburg; and Surgn.-Capt. Cummins, Army Medical Staff.

The limitation of genera, at all times a subject of discussion, is particularly perplexing among Thalamifloral orders; the difficulties that beset the student of *Papaveraceæ* in particular are many and great. A complete review of these difficulties could only be appropriate

in a revision of the order as a whole. Still even in a partial and more or less cursory review like the present, it is impossible to avoid an allusion to some of them; a brief note is therefore added to the systematic account of each genus.

PAPAVERACEÆ.

Key to the Indian genera (including those newly reported).

- * Capsules opening by short valves or pores:—
 - † Stigmas radiating on a sessile disc; (sepals 2, petals 4) 1. PAPAVER.
 - † † Stigmas at the top of a distinct style:—
 - ‡ Stigmas discrete above, patent; sepals 3, petals 6,... 2. ARGEMONE.
 - ‡ ‡ Stigmas concrete throughout, decurrent; sepals 2, petals 4 in 2 pairs, or 5-9 in an imbricate spiral 3. MECONOPSIS.
- * * Capsules dehiscing throughout their length; (sepals 2, petals 4):—
 - † Stigmas sessile:—
 - ‡ Stigmas radiating; valves 3-4, rarely 2; fruit without dissepiment ... 4. ROEMERIA.
 - ‡ ‡ Stigmas prolonged as 2 horizontal arms; fruit with a pseudo-replum in which the seeds are partially embedded ... 5. GLAUCIUM.
 - † † Stigmas at the top of a distinct style:—
 - ‡ Stigmas concrete throughout, valves 3-6 ... 6. CATHCARTIA.
 - ‡ ‡ Stigmas discrete above, valves 2 ... 7. CHELIDONIUM.

1. (1.) PAPAVER LINN.

Key to the Indian species (incorporating the new forms).

- * Perennial; scapes simple leafless; flowers orange-yellow; (filaments subulate; capsule hispid; whole plant hirsute) ... 1. *P. nudicaule*.
- * * Annuals; stems branching leafy; flowers scarlet, purple or pink:—
 - † Stem-leaves not amplexicaul; plants usually hispid:—
 - ‡ Capsules hispid; leaves 2-3-pinnatifid; (flowers scarlet with dark purple eye):—
 - § Sepals obtuse; filaments dilated upwards ... 2. *P. hybridum*.
 - § § Sepals with horn-like subapical processes; filaments filiform ... 3. *P. pavoninum*.
 - ‡ ‡ Capsules glabrous; leaves 1-2-pinnatifid; (filaments filiform):—
 - § Capsules subglobose stalked; lobes of disc overlapping ... 4. *P. Rhœas*.
 - § § Capsules oblong sessile; lobes of disc distinct:—
 - ¶ Lobes of disc plane and separated by shallow sinuses ... 5. *P. dubium*.
 - ¶ ¶ Lobes of disc strongly ridged and separated by deep divisions (disc stellate) ... 6. *P. turbinatum*.

† † Stem leaves clasping; plants glabrous and glaucous;
(capsules glabrous):—

‡ Capsules obovate-oblong, sessile; filaments subulate; small plants 6–12 in. high ... 7. *P. Decaisnei*.

‡ ‡ Capsules globose, stalked; filaments dilated upwards; tall plants 2–4 feet high ... 8. *P. somniferum*.

The genus *Papaver* is hardly an Indian one; *P. somniferum* is only known as a cultivated plant while, except in a cultivated form, *P. Rhæas* is hardly known in India. *P. hybridum* is a species widespread in the Mediterranean and Oriental regions; *P. pavoninum*, *P. turbinatum*, *P. Decaisnei* are three species common in the Orient (Asia Minor, Syria, Persia, Afghanistan and Beluchistan): all four species are therefore Indian only because, along its extreme north-west border, the Indian Empire includes a fringe of their natural geographical area. Of the remaining two the Alpine species, *P. nudicaule*, occurs only in the Hindu-Kush and Karakoram and is thus not even truly Himalayan, while the temperate species *P. dubium* is a mere corn-field weed. Even that is limited to the North-West Himalaya, where it occurs in a form which extends from Southern Russia through all the intermediate countries to the area indicated.

1. (1.) *PAPAVER NUDICAULE* Linn. *Sp. Pl.* ed. i., i. 507 (1753).

VAR. *rubro-aurantiacum* Fisch. ex DC. *Syst. Veg.* ii. 70 (1821); Sims, *Bot. Mag.* t. 2344 (1822); DC. *Prodr.* i., 118 (1824). *P. croceum* Ledeb., *Flor. Altaic.* ii. 271 (1830). *P. alpinum* VAR. *croceum* Fisch. & Mey. *Ind. Sem.* iii, 44 (1837); Ledeb., *Flor. Ross.* i., 87 (1842). *P. nudicaule* VAR. *croceum* Elkan, *Monogr. Papav.* 17 (1839); Walp. *Rep.* i. 111 (1842). *P. nudicaule* H. f. & T., *Flor. Ind.* 249 (1855) Boiss. *Flor. Orient.* i. 107 (1867); H. f. & T. *Flor. Brit. Ind.* i. 117 (1872).

All the Indian wild specimens are referable to this particular variety which has orange-yellow flowers, dark coloured hairs on the scapes and dark-coloured setæ on the capsules. The geographical area of this variety extends from Afghanistan, Northern Kashmir and Western Tibet, through Soongaria and along the Altai range to Mongolia and Northern China.

A remarkably fine cultivated form of this plant is to be found in gardens in South-Eastern Tibet and in the Chumbi valley. The flowers are sometimes over 3 inches in diam. and though occasionally yellow, are usually dark purple and look very much like those of *P. Rhæas*. Some of the Tibet specimens are partially double-flowered: these were collected in the province of Tsang and communicated to Calcutta by the Lama Ujyen Gyatsko. The Chumbi specimens were obtained by one of Dr. King's Lepcha collectors. It is somewhat remarkable that we have never yet succeeded in obtaining seeds of this plant which might be known as *P. nudicaule* VAR. *grandiflora*. Apparently it does not occur in gardens in Sikkim.

2. (2.) *PAPAVER HYBRIDUM* Linn.

3. (—.) *PAPAVER PAVONINUM* Schrenk ex Fisch. & Mey. in *Enum. Pl. nov.* Schrenk 64 (1842); leaves pinnatipartite, segments oblong-

linear incised-dentate sparingly hispid, filaments filiform, sepals hirsute *with a dorsal conical process under the tip*; capsule ovate setose aculeate, stigma convex rays 4–6. *O. A. Mey.* in *Ind. Sem.* ix. 35, 82 (1843); *Bunge, Rel. Bot. Lehm.* 16 (1847); *Stscheg. Bull. Soc. Mosc.* (1854) i., 151; *Trautv. Bull. Soc. Mosc.* (1860) i. 91; *Regel & Herder, Bull. Soc. Mosc.* (1866) iii. 90; *Boiss. Flor. Orient.* i. 116 (1867); *Osten-Sacken & Rupr. Sert. Tianschan.* 38 (1869); *Regel & Herder, Bull. Soc. Mosc.* (1870) ii. 248. *P. hybridum* *Kar. & Kir. Bull. Soc. Mosc.* (1842) i. 141 *non Linn.* *P. cornigerum* *Stocks, Lond. Journ. Bot.* iv. 142 (1852): *H. f. & T. Flor. Ind.* 250 (1855); *Walp. Ann.* iv. 173 (1857).

PANJAB: Peshawar, *Vicary! Stewart!* SCINDE: *Stocks!* BRITISH BELUCHISTAN: near Quetta, *Sanders! Duke! Lace! Duthie! Appleton!* DISTRIB. Throughout Beluchistan, Afghanistan, Turkestan and Soongaria.

Annual, stems slender sparingly branched; leaves, flowers and habit very like those of *P. hybridum*; the capsules however are smaller while the horned sepals and the filiform filaments at once easily distinguish it.

4. (3.) PAPAVER RHÆAS *Linn. Sp. Pl.* ed. i., i. 507 (1753).

VAR. *typica*; stigmatic rays 8–12.

This is an extremely rare plant in India; the only undoubted specimens the writer has seen were collected by Sir D. Brandis in Chamba, Panjab Himalaya (*Brandis n.* 4336!). Some specimens that may also be referable to genuine *P. Rhæas* were collected in Kashmir by Dr. T. Thomson. These, however, in spite of the smaller number of their stigmatic rays, look more like a reversion to type, after “escape,” of the following variety, than like the European plant.

VAR. *latifolia*; stigmatic rays 12–20. *Papaver Rhæas* VAR. *latifolia* *Ham. Mss. in Wall. Cat.* n. 8119 (1830). *P. Hookeri* *Baker in Bot. Mag.* cix. t. 6729 (1883). The SHIRLEY POPPY; *Journ. of Hortic.* (1886) p. 367, f. 55.

Cultivated in Indian gardens from SCINDE, *Stocks!* to the NORTH-WEST PROVINCES, *Royle! Falconer! Thomson! King!* and LOWER BENGAL, *Hamilton! Hooker!*

Annual, branched, 3–4 ft. high, covered with spreading hispid hairs; stem as thick as little finger at base, branches erect and ascending, flowering copiously; flowers 2–4 in. across; petals in unequal pairs, crenulate, pale rose to bright crimson, base wedge-shaped with diffused white to blue-black spot; capsule $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., shortly stalked, crenations of disk rounded overlapping.

From this description, which applies to the cultivated plant, it will be seen that there is hardly room for doubt that we have here to deal with only a form of *P. Rhæas*. The distinguishing botanical feature is the larger number of stigmatic rays; on the strength of this character Mr. Baker has proposed specific rank for the plant. This it certainly does not deserve and from the existence of

a very intermediate state in Kashmir. it is doubtful if its separation even as a variety is altogether valid. It is however very easy, even in the Herbarium, to distinguish this plant from cultivated forms of *P. Rhœas* proper introduced from Europe which grow with a luxuriance that equals that of *VAR. latifolia* itself. The form seems to have originated in Indian gardens and is supposed to have only recently been introduced to European culture. This is however not quite exact, for the Poppy now known as the Shirley Poppy, which seems to be undoubtedly the Indian *P. Rhœas* *VAR. latifolia*, has been in continuous cultivation in Scotland for over half a century.

Occasional references in Indian writings to the presence of *P. Rhœas* must be discounted. In the majority of cases *P. dubium*, not infrequently *P. turbinatum*, is the species intended; the idea having become prevalent that the plant which is really *P. Decaisnei* is *P. dubium*, not unnaturally the casual observer supposes that what is really *P. dubium* must be *P. Rhœas*.*

5. (4.) *PAPAVER DUBIUM* *Linn. Sp. Pl.* ed. i., ii. 1196 (1753.).

VAR. glabrum *Koch, Syn.* 30 (1837). *P. dubium* *VAR. lævigatum* *Elkan, Monogr. Papav.* 25 (1839); *H. f. & T. Flor. Ind.* 250 (1855); *Walp. Ann.* iv. 176 (1857). *P. lævigatum* *M. Bieb. Flor. Taur. Cauc.* iii. *Suppl.* 364 (1819); *DC. Syst. Veg.* ii. 78 (1821); *Prodr.* i. 119 (1824); *Spreng. Syst.* ii. 569 (1825); *Reichb. Pl. Crit.* iv. 41. t. 533 (1826); *C. A. Mey. Verzeichn. Pfl. Cauc.* 175 (1831); *Boiss. Flor. Orient.* i. 114 (1867). *P. glabellum* *Stev. ex DC. Syst. Veg.* ii. 78 (1821). *P. glabrum* *Royle. Ill.* 67 (1839).

All the Indian specimens of *P. dubium* are referable to this variety which is distinguishable from the type only by being subglabrous with the few setæ on the scape, the lower surface of the leaves and the sepals, adpressed. In South-Eastern Europe intermediate forms connecting this with true *P. dubium* are plentiful; no such connecting forms and no examples of true *P. dubium* occur in India. The geographical area of this variety extends from Southern Russia, the Caucasus and Georgia through Eastern Asia Minor, Armenia and Persia to Northern Beluchistan, Afganistan and the North-West Himalaya as far eastward as Garhwal. The figure by Reichenbach quoted above (*Pl. Crit.* 533) is made from Bieberstein's original examples collected near Odessa; that figured under the same name by the same author in *Flor. German.* t. 4478 b. is not this plant.

6. (—.) *PAPAVER TURBINATUM* *DC. Syst. Veg.* ii. 84 (1821); leaves 1-2-pinnatisect, filaments filiform, capsule elliptic-oblong glabrous, stigma 6-10-rayed crenations of disc deeply cut, widely separated and ridged. *DC. Prodr.* i. 120 (1824); *Boiss. Flor. Orient.* i. 144 (1867). *P. macrostomum* *Boiss. & Huet. in Sched. Pl. Huet.* (1855); *Boiss.*,

* In a circular regarding sheets missing from the Wallichian type Herbarium which is preserved in the rooms of the Linnean Society of London n. 8119 is noted as being there unrepresented. This is a mistake; the specimen is present and in good condition; it has been overlooked owing to its having been inadvertently glued down along with n. 8120.

Flor. Orient. i. 115 (1867). *P. Rhœas* Wall. *Cat.* n. 8120 (1830) *nec* Linn. *P. Rhœas*? *H. f. & T. Flor. Ind.* 251 (1855).

KASHMIR: common, *Falconer!* *Thomson!* *Aitchison!* at Romoo, 6000 feet, *Clarke* n. 28543! at Srinagar, 5300 feet, *G. Gammie!* cultivated or an escape. BENGAL: cultivated, *Hamilton!* DISTRIB. Yarkand, Afghanistan, Persia and Armenia.

Annual, branched, 1-2 ft., scapes with adpressed hairs; leaves, habit and general appearance of *P. dubium* VAR. *glabrum* (*P. lævigatum* M. Bieb.) and of *P. Rhœas* VAR. *commutatum* (*P. commutatum* Fisch. and Mey.) but easily distinguished from all forms of *P. Rhœas* by the shape of its capsule which is like that of *P. dubium*, and from all forms of *P. dubium* by its deeply lobed, star-like disc with ridged crenatures. *Petals* purple with a dark basal eye; *capsule* $\frac{3}{4}$ in. -1 in. long.

The presence of this species in India has been overlooked owing to its having been mistaken when in flower for *P. Rhœas* and when in fruit for *P. dubium*. Of its specific position there is not however any doubt: the Indian plant is exactly that which forms the type of *P. macrostomum* Boiss. and Huet. Since the publication of the *Flora Orientalis* however very large suites of specimens of *P. macrostomum* have been reported. These show that, like its allies *P. dubium* and *P. Rhœas*, this is an extremely variable plant and a careful study of all the specimens in M. Boissier's own Herbarium, in Herb. Kew and in Herb. Paris has convinced the writer that *P. macrostomum* is not specifically distinct from *P. turbinatum*, the solitary specimen of which has the same capsule and disc and only differs in foliage and in stature from the original specimens of *P. macrostomum*. Since the latter species was proposed all the necessary intermediates have been reported again and again.

8. (—.) PAPAVER DECAISNEI *Hochst. & Steud.* in *Schimp. Pl. Arab. exs.* n. 125 (April 1836); leaves pinnatipartite, segments lanceolate-dentate, cauline rounded at base and amplexicaul; capsule ovate-oblong glabrous, stigma 5-7-rayed. *Boiss. Flor. Orient.* i. 115 (1867). *P. turbinatum* *Fresen. Mus. Senkenb.* 173 (1834) *non* DC. *Papaver* sp. nov. *Decaisne, Fl. Sinai.* 45 (1835). *P. dubium* VAR. *Decaisnei* *Elkan, Monogr. Papav.* 26 (1839). *P. dubium* VAR. *lævigatum* *H. f. & T. Flor. Ind.* 250 (1855) *in part*; *Aitchison. Journ. Linn. Soc.* xviii. 32 (1881) *in part. non* *Elkan.*

PANJAB: Rawal Pindi, *Aitchison* n. 44! Trans.-Indus dist., *Stewart!* SCINDE: *Stocks!* DISTRIB. Beluchistan, Afghanistan, Persia, Arabia, S. Syria.

A glaucescent glabrous annual or rarely a biennial 6-12 in. high, with very short stems and long peduncles; *flowers* 1 in. diam., sepals glabrous, petals obovate rose purple with dark eye; anthers shortly oblong.

The Eastern limit of the geographical area of this species lies just inside the frontier of the Indian Empire along its whole north-west border. The species has been associated by Elkan and by most Indian botanists with *P. dubium* VAR. *lævigatum*, and the resemblance is indeed often very great. It is however easily distinguished by its perfectly glabrous glaucous appearance and by its stem-leaves which

clasp at the base. Some specimens collected by Dr. Stapf in Persia show that occasionally the species may be distinctly biennial.

9. (5.) *PAPAYER SOMNIFERUM* Linn.

It is of interest, in connection with the theory that the people of China first learned the use of Opium and first obtained the Opium Poppy itself from India, to find from a careful examination of specimens of the Poppy cultivated for Opium in China that are preserved in the magnificent botanical collections of London, Paris and Geneva, that this Poppy belongs to a race quite distinct from the Indian plant, more nearly allied to the form of *Papaver somniferum* that produces Persian Opium than to the form that is cultivated in Hindustan. The specimens referred to come from Yunnan, Szechuen, Hunan and Hupeh. Curiously the only Chinese specimens of *Papaver somniferum*, cultivated for Opium, that are indistinguishable from the Indian race, which the writer has seen, are in Herb. Calcutta. They were communicated by Fortune in 1853 and are from the Eastern province of Che-kiang, not from Central or South-Western China where the Opium Poppy is chiefly cultivated.

2. (1*.) *ARGEMONE* LINN.

1. *ARGEMONE MEXICANA* Linn.

Four of the gatherings issued by Wallich under this name (*Cat. Lith.* n. 8126) are really this species, the fifth (8126 E. from Kamaon) is the yellow-flowered *Meconopsis* described by Hooker and Thomson as *M. robusta*.

3. (2.) *MECONOPSIS* VIGUIER.

Key to the Indian species (incorporating the new forms.)

* Stems, leaves, sepals and ovaries prickly; stigmas pyramidal (flowers pale purple, papaveroid, (*i.e.*, petals 4) exceptionally sanguinarioid, (*i.e.*, 5-8):—

† Stems not leafy, radical leaves many persisting; scapes radical 1-fl'd. or pseudo-cymose from agglutination of scapes, pedicels not or very rarely bracteate, torus distinctly enlarged; leaves lanceolate (entire or, rarely, acutely dentate; capsules densely aculeate short oblong or obovate, twice as long as style)... 1. *M. horridula*.

† † Stems leafy, radical leaves few vanishing; flowers in racemose cymes with bracteate pedicels; torus not expanded; leaves oblong:—

‡ Leaves irregularly pinnatifid; capsules densely aculeate, short oblong or obovate, twice as long as style ... 2. *M. aculeata*.

‡ ‡ Leaves with sinuate or subentire margins; capsules sparsely aculeate long narrowly obconic, five times as long as style ... 3. *M. sinuata*.

* * Stems, leaves, sepals and ovaries without prickles; stigmas capitate entire or (in *M. primulina*) 2-lobed:—

† Stems leafy:—

‡ Stems often branching, cymes many-flowered rare-

ly simple; flowers papaveroid, (*i.e.*, petals 4); (tall tomentose or hirsute plants, radical leaves few, cauline many all scattered; capsules setose):—

§ Capsules ovate 8–11-valved, style short much thickened at base:—

¶ Flowers yellow:—

× Stems and leaves sparsely crinite
× at length glabrescent; cauline leaves pinnatifid, lobes rounded acute; sepals sparsely crinite capsule with few adpressed setae

4. *M. robusta.*

× × Stems, leaves and sepals hispidly
× × hairy and densely softly tomentose; cauline leaves coarsely dentate; capsule densely covered with ascending setae and close stellate pubescence ...

5. *M. paniculata.*

¶ ¶ Flowers white (stems, leaves and sepals hispidly hairy and densely softly tomentose; cauline leaves finely toothed) ...

6. *M. superba.*

§ § Capsules shortly cylindric 5–7-valved, style long slender throughout:—

¶ Flowers dark fuscous-purple; stems, leaves and sepals sparsely hirsute with long hairs ...

7. *M. napaulensis.*

¶ ¶ Flowers pale blue-purple; stems, leaves and sepals softly densely puberulous ...

8. *M. Wallichii.*

‡ ‡ Stems always simple, cymes few-fl. simple; flowers sanguinarioid, (*i.e.*, petals 5–9); (purple):—

§ Radical leaves few vanishing; cauline close-set on a short stem (pseudo-radical) scapes long: small glabrous or sparsely setose plants with narrowly ovoid glabrous capsules and 2-lobed stigmas ...

9. *M. primulina.*

§ § Radical leaves many persisting, cauline few the lower scattered the upper whorled; pedicels short; tall softly hairy plants with linear-oblong sparsely hispid capsules ...

10. *M. grandis.*

† † Stems not leafy scapes numerous radical, (flowers purple, radical leaves many persisting):—

‡ Leaves simple dentate, scapes long, capsules linear-oblong sparsely hispid; large softly hairy plants with sanguinarioid flowers, (*i.e.*, petals 5–8) ...

11. *M. simplicifolia.*

‡ ‡ Leaves 2–3-pinnate; scapes short, capsules shortly obovate glabrous; dwarf perfectly glabrous plants with sub-papaveroid flowers, (*i.e.*, petals 4 or 5) ...

12. *M. bella.*

Species 1–3 constitute the group *Aculeatæ* extending throughout

the Himalayas and Tibet and occurring in Szechuen and Yunnan; species 4-8, the group *Robustæ* peculiar so far as is known to the central and Eastern Himalaya; species 9 belongs to the group *Primulinæ* of which the remaining known members inhabit Szechuen and Yunnan; species 10 and 11 to the *Grandes* of which the three other known members occur in Kansu, North Tibet, Szechuen and Yunnan; species 11 is the only representative of a very distinct group the *Bellæ*.

The genus includes 2 other groups not represented in India; *viz.*, the *Chelidonifoliæ* with 2 Chinese and 1 Western European species and the *Anomalæ* with 2 Californian species.

Unlike *Papaver*, *Meconopsis* is a characteristically Himalayan genus since 12 species, or nearly one-half of the known forms have been reported from the Himalayan region. Only two occur in the Western Himalaya; one, *M. aculeata*, extending from Garhwal and Kunawar to Kashmir, overlaps the eastern fringe of the area occupied by *Papaver*; the other, *M. robusta*, which is perhaps only a condition, and certainly is at most the representative, of the more widely distributed *M. paniculata*, is confined to Kamaon. It is only when we reach the region from Central Nepal eastward that we come upon the main body of the genus. In Central Nepal we find three species, *M. paniculata*, *M. napaulensis* and *M. simplicifolia*; these we find in Eastern Nepal and Western Sikkim along with five other forms; *M. Wallichii*, which seems only a local manifestation of *M. napaulensis*; *M. sinuata*, a similar local manifestation of *M. aculeata*; *M. grandis*, a local manifestation of *M. simplicifolia*; *M. horridula*, a somewhat variable species widely extended throughout Tibet and Western China of which *M. aculeata* and *M. sinuata* alike appear to be derivatives; lastly, the exceedingly distinct *M. bella*. Somewhat further east we come upon *M. superba*, a very handsome species that would however appear to be hardly more than a local representative of *M. paniculata*; and *M. primulina*, a near ally, and perhaps only the local representative of a Szechuen species, *M. Henrici*.

The region which includes Western and Central China from Kansu to Yunnan and Hupeh is quite as rich in species as the explored Eastern Himalaya. In Kansu there are three species; *M. quintuplinervia* and *M. punicea* extending to Northern Tibet, and *M. integrifolia* extending to Szechuen and Yunnan; all three are near allies of the Sikkim *M. simplicifolia*. In Szechuen we find six; one species, confined to the province, is *M. Henrici* nearly allied to the Himalayan *M. primulina*; another is a form of the Tibeto-Himalayan *M. horridula*; a third is apparently a form of the Sikkim *M. sinuata*; a fourth is *M. integrifolia* already discussed; the last two are species which are very distinct from the rest and which have no Himalayan representative, but which are very closely allied to each other; these are *M. chelidonifolia*, confined to Szechuen, and *M. Oliveriana* extending also to Hupeh. In Yunnan, besides *M. integrifolia* and a form of the nearly ubiquitous *M. horridula* there are two species of the *Primulinæ* group, *M. lancifolia* and *M. Delavayi*. * These two species, originally tentatively referred by M. Franchet, in the absence of ripe fruit, to *Cathcartia*, are, as their distinguished author has

* *Meconopsis lancifolia* Franchet MSS. in *Herb. Paris*. *Cathcartia lancifolia* Franchet *Bull. Soc. Bot. Fr.* xxxii. 391 (1886). *Meconopsis Delavayi* Franchet MSS. in *Herb. Paris*. *Cathcartia Delavayi* Franchet, *Bull. Soc. Bot. Fr.* xxxii. 390 (1886).

most obligingly pointed out to the writer, true *Meconopses*, the ripe capsules recently received having valves that are only partially dehiscent. Still another possible species is the plant described by M. Franchet as *M. betonicaefolia*. It may well be a *Meconopsis* but the fruit is not ripe and from its evident close affinity to two Himalayan species that seem undoubtedly referable to *Cathcartia* this may also prove to be better placed in that genus. From Hupeh the already mentioned *M. Oliveriana** is the only species as yet recorded; like *M. chelidonifolia* it also occurs in Szechuen.

From what has been said it will be clear that the home of *Meconopsis* is the conjoint Himalo-Tibetan and Tibeto-Chinese regions. But while this is the case there are three species that do not occur within this area and that exhibit a distribution which, even for outliers, is remarkable and peculiar. One species *M. cambrica*, that on which Viguier originally founded the genus, is confined to Western Europe, where it extends from Portugal to Wales, Cumberland and Strath-Clyde, thus overlying the western fringe of the *Papaver* area as *M. aculeata* overlies its eastern fringe. And strangely enough its nearest allies in the genus would seem to be *M. chelidonifolia* and *M. Oliveriana*—precisely the species from which it is furthest separated geographically. The two remaining species *M. crassifolia* and *M. heterophylla* occur in Western America. These are altogether anomalous in having valves which dehisce like those of *Papaver* by short subquadrate pores and in having their stigmatic lobes discrete as in *Chelidonium* or in *Argemone*. More disconcerting still is the fact that in the same area there occur two true *Papavers*, *P. californicum*, and *P. Lemmoni*, the former with a perfectly normal disc, the latter with an umbonate one like *Papaver stylatum*, while all four species are so very nearly related that it is only by an examination of their ripe capsules that they are to be definitely separated. It is not therefore surprising that so careful an observer and so great an authority on Californian species as Prof. E. Greene proposes to treat all four as congeneric. Whether, as he proposes, all should be treated as *Papavers* is a matter

* *Meconopsis Oliveriana* Franchet & Prain MSS. in *Herb. Paris.* and in *Herb. Kew.* Stems tall copiously branched, setulose below, glabrous above; leaves numerous, lower and middle shortly petioled sparingly strigose on both surfaces as are the upper sessile somewhat amplexicaul, ovate-oblong pinnatipartite; segments 1-2-jugate petiolulate ovate pinnatifid, lobes rounded obtuse, terminal segment deeply 3-fid: peduncles numerous slender and sepals glabrous; flowers solitary at the end of stem and of the many axillary always leafy branches; capsule long cylindric 4-5-valved, glabrous; placentas nerviform.

CHINA: Szechuen, Tchen-kéou-tin, *Farges* n. 390! Hupeh; *Henry* n. 6863!

Stems erect 2-3 ft. high, as thick as a swan's quill at base, flowers 8-12 terminal; buds globose; style very short and thick; capsule including style $1\frac{1}{2}$ in. long, $\frac{1}{4}$ in. across; rootstock villous.

This species so closely resembles in all its vegetative characters *M. chelidonifolia* Franchet, that at first it is hard to believe that they can be distinct. The fruit is however totally different; in *M. chelidonifolia* the capsule is short, ovate, $\frac{5}{8}$ in. long, and $\frac{1}{3}$ in. across, the style is distinct and slender and the placentas are deeply intruded as they are in the true Poppies. Another difference is in the colour of the petals which seem, judging from dried specimens in *Herb. Paris*, to be purplish; certainly they are not bright yellow as in *M. chelidonifolia*. Both species much resemble *Cathcartia villosa*.

that requires, in the writer's opinion, further consideration. It is true that in the genus *Papaver*, as at present understood, are included a number of forms nearly allied to *P. armeniacum* which have valves that dehisce like *Meconopsis* valves and have stigmas of the normal *Meconopsis* type, so that they differ from *Meconopsis* only in the absence of any style. But it does not seem necessary on this account to propose that we should return to the view adopted by Linnæus as regards the European, and by Don as regards the Himalayan species, and speak of all the *Meconopses* as *Papavers*.

Another point of interest in the genus is the number of petals. This is given in most systematic treatises as 4. In the three species *M. cambrica*, *M. chelidoniifolia*, *M. Oliveriana*, forming the *Chelidonifoliæ*, this is the case, as it is in the *Anomalæ* (*M. heterophylla*, *M. crassifolia*) and in the *Robustæ* (*M. robusta*, *M. paniculata*, *M. superba*, *M. napaulensis*, *M. Wallichii*). Among the *Aculeatæ*, *M. aculeata* and *M. sinuata* would appear to be always 4-petaled, but with *M. horridula* the exceptions are quite as frequent as the rule. In *M. bella* which may have 4 petals we usually find 5; while in two groups—the *Grandes* (*M. simplicifolia*, *M. quintuplinervia*, *M. punicea*, *M. grandis*, *M. integrifolia*) and the *Primulinæ* (*M. Henrici*, *M. primulina*, *M. lancifolia*, *M. Delavayi*)—we by no chance ever find 4 petals; in all these species we find, as in *Sanguinaria*, 5-8 or 9 petals imbricately spirally arranged. Yet there is no doubt, in spite of this divergence from the characters usually ascribed to the genus that these species are genuine *Meconopses*.

§ 1. *Aculeatæ*. *Stems, leaves, sepals and ovaries prickly; stigmas pyramidal; flowers pale purple, usually Papaveroid, i.e., with 4 petals; (occasionally in M. horridula VAR. typica and usually in M. horridula VAR. racemosa with petals 5-8).*

1. (2.) *MECONOPSIS HORRIDULA* H. f. & T.

VAR. typica; scapes radical one-fl'd; leaves membranous entire. *M. horridula* H. f. & T. *Flor. Ind.* 252 (1855); *Walp Ann.* iv. 171 (1857). *Flor. Brit. Ind.* i. 118 (1872).

SIKKIM: Kongra-Lama, Bomtso and Kan-ka-la, 14-17000 ft. abundant, *Hooker!* Kan-kra-la and Donkia, *G. Gammie! Cummins!* CHUMBI: at Te-ling, *Dungboo!* *DISTRIB.* Central Tibet (*Rockhill!*) and South-Eastern Tibet (*Thorold! King's Collectors!*)

VAR. racemosa; some or all of the scapes agglutinated to form a leafless grooved stem with pseudo-racemose inflorescence and bractless pedicels; leaves membranous entire or (rarely) dentate. *M. racemosa* *Maxim. Bull. Acad. Petersb.* xxiii. 310 et *Mel. Biol.* ix. 713 (1876); *Forbes & Hemsl. Journ. Linn. Soc.* xxiii. [*Ind. Sinens.* i.] 34 (1886); *Maxim. Flor. Tangut.* i. 36. t. 9. f. 1-6 et t. 23. f. 26 (1889).

SIKKIM: Ta-ne-gang, Gia-gong and near Cho-la, *King's Collectors!* Lachung, *Dungboo!* Tankra-la (specimens with deeply dentate leaves), *G. Gammie!* CHUMBI: Sham-chen, *Dungboo!* Ta-Chey-Kung, *King's Collectors!* *DISTRIB.* North Tibet (*Przewalski!*) Central Tibet (near Lhasa, *Dungboo!*) Northern Szechuen (*Potanin!*)

It is impossible to sustain the specific rank claimed for this form. In the northern and central portions of the area inhabited by the species the two forms come from adjacent districts. In Sikkim, the extreme southern limit of its geographical distribution, the two forms grow intermixed; all our Calcutta gatherings, as well as Hooker's original ones, show transitions from the one to the other.

[VAR. *rudis*; stems like those of VAR. *racemosa* but taller, thicker, hardly grooved and leafy at the base with the lower pedicels bracteate; leaves very thick with subsinuate margins and very sparsely prickly as are the sepals and stems; capsules small, hardly exceeding in diam. the much expanded torus. *M. racemosa* Franchet, *Bull. Soc. Bot. Fr.* xxxiii. 38 (1886); *Plant Delavay.* 41 (1889) *via Maxim.*

YUNNAN: Li-kiang, *Delavay*!

This plant, united by M. Franchet with Mr. Maximowicz' *M. racemosa*, certainly differs varietally in the points noted.]

The suggestion made in the *Flora Indica* and again in the *Flor. Brit. Ind.* that *M. horridula* may after all be no more than an Alpine form of *M. aculeata* has not, so far, been supported by the collection of the necessary intermediate forms. On the contrary the facts of distribution among the members of the *Aculeatæ* group point decidedly in the opposite direction. Although *M. aculeata* has capsules remarkably like those of *M. horridula* its torus is not thickened, its leaves are widely dissimilar, its stem is leafy and its pedicels are bracteate.

2. (3.) MECONOPSIS ACULEATA *Royle, Ill.* 67. t. 15 (1839); *Walp. Rep.* i. 110 (1842); *H. f. & T. Flor. Ind.* 253 (1855); *Walp. Ann.* iv. 171 (1857); *Klotzsch, Reis. Pr. Waldem.* 129 (1862); *Hook. Bot. Mag.* t. 5456 (1864); *H. f. & T. Flor. Brit. Ind.* i. 118 (1872). *M. Gulielmi-Waldemari* *Klotzsch, Reis. Pr. Waldem.* 129. t. 36 (1862); *Walp. Ann.* vii. 86 (1868). *M. napaulensis* *Jacquem. MSS. in Herb. Paris; Falc. MSS. in Herb. Saharanpur; nec M. napaulensis DC. Wall. Cat.* n. 8122!

It is not possible to accord even varietal rank to the form figured and described by Klotzsch as *M. Gulielmi-Waldemari*.

3. (—) MECONOPSIS SINUATA *Prain*; prickly, stem leafy, leaves oblong-lanceolate, flowers pale blue-purple; capsules long narrowly obconic, sparsely prickly.

VAR. *typica*; leaves obtuse with sinuate margins.

SIKKIM: Patang-la, Pey-kiong-la and Ney-go-la, *King's Collectors!* Jongri, *G. Gamie!* BOOTAN: Dichu Valley, *Cummins!*

[VAR. *Prattii*; leaves subacute serrate or subentire.

SZECHUEN: near Tachienlu, *Pratt.*, n. 525!]

Rootstock stout, fusiform; *stems* 1-3 ft. smooth except for the scattered prickles. *Leaves* 4-7 in., long petioled, upper cauline sessile. *Cymes* few-fl., *flowers* 2-3 in. diam., *pedicels* bracteate slender fastigiate in fruit, prickly; *petals* 4. *Capsule* 1¼-1½ in. sparsely prickly, ultimately subglabrous; *style* ½-⅝ in.; *stigma* small. *Seeds* scabernlous hilum slightly crested.

This species has much the habit of *M. aculeata* of which it appears to be in

the Eastern Himalaya the representative form. It has however different leaves and a totally different capsule with a much smaller stigma. The plant here described as VAR. *Prattii* has leaves quite like those of *M. horridula* VAR. *racemosa* though of somewhat thinner texture. But besides having bracteate pedicels it differs in having an unexpanded torus and a much less aculeate ovary. The capsules of VAR. *Prattii* are unfortunately not yet ripe but they agree exactly with those of typical *M. sinuata* at a similar stage and are totally unlike those of *M. horridula* or *M. aculeata* at any stage.

§ 2. *Robustæ.* *Tall often branching; stems, leaves and sepals hirsute or pubescent; ovaries setose; stigmas capitate; leaves pinnatifid to -partite, radical many withering, cauline numerous all scattered; flowers Papaveroid, i.e., with 4 petals.*

4. (4.) *MECONOPSIS ROBUSTA* H. f. & T. *Flor. Ind.* 253 (1855); tall, glaucescent, glabrous or sparsely crinite with soft flexuous spreading hairs, leaves pinnatifidly lobed, lobes rounded acute, tips of peduncles and sepals sparsely patentely crinite; cymes simple, flowers sulphur yellow, margins of petals crenulate; capsule obovate-oblong 8-11-valved, sparingly covered with adpressed sub-deciduous setæ. *Walp. Ann.* iv. 171 (1857). *M. nipalensis* Hook. f. *Bot. Mag.* t. 5585 (1866) *nec DC. et vix* H. f. & T. *Flor. Ind.* & *Flor. Brit. Ind.* *M. robusta* H. f. & T. *Flor. Brit. Ind.* i. 118 (1872) *in part; excluding the Nepal plant and the citation* Wall. Cat. 8121. *Argemone mexicana* Wall. Cat. 8126 E (1830) *nec Linn.* Wall. Cat. n. 8124!

WESTERN HIMALAYA: Kamaon, 8-10,000 ft. *Blinkworth* in Wall. Cat. n. 8124! 8126 E! and in a third specimen without number in the Wallichian type herbm.! Nanik, *Strachey and Winterbottom!* Chenab Valley, *Stewart!* *Ellis* n. 1362! 1471! near Mussoorie, *King!* Pindi, *Collett!* Palang Gadh, Byaus; above Ramri; and Galmar, 10-12,000 ft., *Duthie!*

Stems simple or branched 4-6 ft high almost 2 in. thick at base; cymes lax-fl'd. 1-2 ft. long, flowers 2-3 in. across; sepals $\frac{1}{2}$ in.; styles thickened at base $\frac{1}{2}$ in long; capsule, including style, $1\frac{3}{4}$ in.

This species, apparently strictly confined to Kamaon though not at all uncommon there, is perhaps only a geographical form, certainly is the western representative of the next species, from which it only differs in the want of fine pubescence intermingled with its long hairs, in the somewhat different lobulation of its leaves and in the margins of its petals being crenulate. In the *Flora Indica* Hooker and Thomson have cited only the Kamaon locality and only Wallich's n. 8124, and 8126, both of which came from that province, for their species. The description given, however, of the capsule applies rather to Wallich's n. 8121 from Nepal which is cited as equivalent to n. 8124, in the *Flora of British India*, where the locality Nepal is also given for the species. But the plant thus included (Wall. Cat. n. 8121) is *not* the same as the Kamaon one; it is the true *M. napaulensis* of DC. [*Prodr.* i. 121]—the crimson-flowered portion of *Stylophorum paniculatum* of G. Don [*Gen. Syst.* i. 135]—and is not distinguishable from the *M. Wallichii* VAR

rubrofuscus of *Bot. Mag.* t. 6760. This plant agrees with *M. robusta* in having hirsute, but not tomentose, stems, leaves and sepals, but differs in having dark-red instead of yellow flowers and in having a narrower capsule with reddish spreading instead of adpressed or ascending yellow setæ with about half the number of valves and with a longer style slender throughout.

5. (5.) *MECONOPSIS PANICULATA* Prain; tall stout hirsute with soft flexuous spreading hairs and densely clothed with a soft substellate golden-yellow or grey pubescence; leaves linear-oblong or oblanceolate sinuately lobed, lobes widely-triangular-toothed, cymes paniculate or simple; flowers yellow, margins of petals entire; capsule obovate-oblong 8-11-valved densely covered with ascending subpersistent setæ and with close stellate pubescence.

VAR. *typica*; cymes paniculate, pedicels subfastigiate branched longer than the leaves even in flower sepals sometimes only puberulous. *Papaver paniculatum* D. Don, *Prodr. Flor. Nep.* 197 (1825). *Stylophorum paniculatum* G. Don, *Gen. Syst.* i. 135 (1831) *in part only and as to the yellow-fld. plant cited.* *Meconopsis napaulensis* Walp. *Rep.* i. 110 (1842) *not of DC.* *Meconopsis Wallichii* H. f. & T. *Flor. Ind.* 254 (1855) Walp. *Ann.* iv. 171 (1857); H. f. & T. *Flor. Brit. Ind.* i. 119 (1872) *in part only and as to the citation* Wall. *Cat.* n. 8123/b; *not of Hook.* *Polychætia paniculata* Wall. MSS. in *Herb. Wall.* n. 8123/b.

NEPAL: Gossain Than; Wallich. n. 8123/b! SIKKIM: Jongri, King's Collectors! Ling-tu, King's Collectors! Phalloot, 10,000 ft., King's Collectors! Lachung and Tankra, 11,000 ft., G. Gammie! BOOTAN: Tak-poo, Dungboo!

VAR. *elata*; cymes simple, pedicels usually solitary, sometimes 2 together, spreading; not or hardly longer than the leaves in flower, elongating and fasciculate in fruit. *Meconopsis nipalensis* H. f. & T. *Flor. Ind.* 253 (1855); Hook. f. *Ill. Him. Pl.* t. 9 (1855); Walp. *Ann.* iv. 171 (1857); H. f. & T. *Flor. Brit. Ind.* i. 118 (1872): *M. nepalensis* Lemaire, *Ill. Hort.* iii. 95 (1856) — *not M. napaulensis DC.* *M. Wollastonii* Regel, *Gartenfl.* xxv. 291 (1876) *name only.* Wall. *Cat.* n. 8123/a.

CENTRAL HIMALAYA: Wallich, n. 8123/a! SIKKIM: Lachen, Hooker! Natong, Dungboo! Patang-la, King! Jongri, King's Collectors! Singalelah, G. Gammie! Lachung, G. Gammie!

Stems sparingly branched or simple 3-5 feet high, 2-3 in. thick at base; radical and lower cauline leaves petioled 6-18 in. long; cymes lax-fld. 1-2 feet long conspicuous; sepals in VAR. *typica* $\frac{1}{2}$ - $\frac{3}{4}$ in., in VAR. *elata* 1 in. long; flowers in VAR. *typica* 2 in., in VAR. *elata* 3 in. diam.; style thickened at base $\frac{1}{2}$ in. long; capsule, including style, $1\frac{1}{2}$ -2 in.

Except for the more branching habit, the smaller amount of gross pubescence and the smaller flowers in VAR. *typica* there is nothing to separate the two varieties which pass into each other by many intermediates and are only sustained here in order the more easily to explain the somewhat complex synonymy which has arisen

from the inadequacy of the material in European Herbaria. In some cases *var. typica* has only a close stellate pubescence and then remarkably resembles *M. Wallichii*, but even if the colour of the petals has not been noted the ovaries with 10–11-placentas and the 10–11-lobed stigma, or at a later stage the larger ovate 10–11-valved capsule with shorter style much thickened below and the altogether different pubescence of the capsule amply distinguish this from *M. Wallichii*.

That *Wall. Cat. n. 8123/b* is D. Don's *Papaver paniculatum* is made certain by the fact that Don has himself written this name on the type sheet of *Wall. Cat. n. 8123/b*, which moreover retains the original field ticket on which Wallich has written the MSS name *Polychætia paniculata*. D. Don has at the same time identified *n. 8123/b* with *Meconopsis napaulensis* DC.; this identification is quite erroneous; *Meconopsis napaulensis* forms the red-flowered portion of G. Don's *Stylophorum paniculatum* whereas D. Don's *Papaver paniculatum* forms the yellow-flowered portion of G. Don's *Stylophorum paniculatum*. Hooker and Thomson on the other hand have assigned the name *M. nipalensis* to *Wall. Cat. n. 8123/a*, and have referred *Wall. Cat. n. 8123/b* to *M. Wallichii* in this following Sir W. Hooker who does not however include Wallich's yellow-flowered Nepal plant in his description of the blue-flowered Sikkim one though he cites the sheet itself. Besides being both, as it now transpires, truly conspecific, neither of the portions of Wallich's *n. 8123* agrees at all well with the original description of *M. napaulensis*; that description applies alone among the Himalayan species, to *Wall. Cat. n. 8121* and a comparison of that number with the original *M. napaulensis* in Mr. C. de Candolle's "Prodromus Herbarium" shows them to be identical.

The precise locality of *Wall. Cat. n. 8123/a* is doubtful. The original field ticket is missing; in the *Lith. Cat.* list it stands as "Kamaon?" This citation is almost certainly wrong; for the species does not occur amongst the plants sent by Blinkworth from Kamaon, and no collector has found it in Kamaon since Blinkworth's time. In all probability, *Wall. Cat. n. 8123/a*, like *n. 8123/b*, came from Nepal.

6. (—.) *MECONOPSIS SUPERBA* King; tall stout hirsute with soft flexuous spreading hairs and densely clothed with soft grey pubescence; leaves obovate oblong serrate; cymes simple; flowers white margins of petals entire; ovary globose 7–11-valved densely clothed with adpressed setæ and with close stellate pubescence.

BOOTAN: Ho-Ko-Chu, *Dungboo*!

Stems simple, apparently 6 ft. high, $1\frac{1}{2}$ in. thick within 2 feet of top; cauline leaves sessile amplexicaul 10–20 in. long; cymes rather dense-fld., pedicels 2–3 in each axil; sepals $1\frac{3}{4}$ in. long; flowers nearly 4 in. diam.

This very fine plant is perhaps only a form of *M. paniculata* *var. elata*; the chief differences are the larger size of all its parts, the white, not yellow, petals and the serrate but not lobed cauline leaves. The ovary is exactly like that of *M. paniculata*; ripe fruit is as yet unknown.

7. (—.) *MECONOPSIS NAPAULENSIS* DC. *Prodr. i. 121* (1824); tall glaucescent sparsely hirsute with soft flexuous spreading hairs rarely also thinly substellately pubescent, leaves lobed pinnatipartite or lyrate-pinnatisect lobes rounded-oblong widely crenate-dentate; cymes simple or paniculate, tips of peduncles and sepals patently hirsute,

flowers dark fuscous-purple, capsules subcylindric or narrowly ovate 4-6-valved, densely covered with harsh setæ at first yellow and adpressed at length rufous and spreading or subreflexed. *Meconopsis robusta* H. f. & T. *Flor. Brit. Ind.* i. 118 (1872) *in part and as to the Nepal plant cited* (Wall. Cat. n. 8121) *not of H. f. & T. in Flor. Ind.* M. *Wallichii* VAR. *rubrofusca* Hook. f. *Bot. Mag.* t. 6760 (1884). *Stylophorum nepalense* Spreng. *Syst.* iv. cur. post. 203 (1827). *S. paniculatum* G. Don, *Gen. Syst.* i. 135 (1831) *in part only and as to the crimson-fl. plant cited.*

NEPAL: Gossain Than, Wallich n. 8121! Thari, in Eastern Nepal, *King's Collectors*! SIKKIM: Tehni-Zen *King's Collectors*! Tiamphung and elsewhere in Jongri, frequent, *King's Collectors*!

Stems simple 2-5 feet high, $\frac{1}{2}$ -1 in. thick at base; flowers nodding, 3 in. in diam.; lower cauline leaves long-petioled; sepals rather densely crinite but not or sparsely stellate-pubescent; petals broadly obovate-oblong; capsules $\frac{1}{2}$ -1 in. with a slender style $\frac{1}{2}$ - $\frac{3}{4}$ in. long.

The bibliographical relationship of this species to *M. robusta* and *M. paniculata* has been already explained. From both it is readily distinguished by its dark purple not yellow flowers, by its smaller capsule with fewer valves and very different setæ, and by its much longer slender style. Its association with *M. robusta* has been due to both having rounded lobes of leaves and to the two having very similar sepals. Its identification with *M. paniculata* has been the result of a misapprehension on the part of Mr. D. Don who, of the two *Meconopsis* collected by Wallich in Nepal, has, contrary to M. de Candolle's explicit statement, selected the many-valved one as the equivalent of the *Prodromus* species. Mr. G. Don has attempted to overcome the difficulty thus created by treating these two Nepal plants, the red and the yellow-fl., as conspecific. This is however impossible for the botanical relationship of *M. napaulensis* is, as Sir Joseph Hooker has clearly shown, in the most recent notice of this species (*Bot. Mag.* t. 6760), with *M. Wallichii*. It has many of the characters of that plant but besides having dark-red-, in place of pale-blue-purple flowers it is easily distinguished by its leaves and sepals being patently crinite with long hairs and by having very little, usually indeed none, of the close stellate pubescence that characterises the leaves and sepals of *M. Wallichii* where on the other hand there are none of the long hairs of *M. napaulensis*. This species has only recently been successfully introduced into European Gardens, plants having been reared by Mr. G. Wilson in his garden at Weybridge from seeds sent by Dr. King. It may ultimately be satisfactorily proved that Sir Joseph Hooker's suspicion, which the writer shares, that this and *M. Wallichii* are only forms of one species, is correct. In that case the name *M. Wallichii* which has become familiar in European horticulture will have to give way to the older name *M. napaulensis*, which is at present, but quite erroneously, associated in European gardens with Wallich's yellow-fl. species. In the meantime however it is more satisfactory and less misleading to treat *M. napaulensis* and *M. Wallichii* as specifically distinct.

8. (6.) *MECONOPSIS WALLICHII* Hook. *Bot. Mag.* t. 4668 (1852); *Jard. Fleur.* iii. t. 315 (1853); *Belg. Hortic.* iv. t. 18 (1854); *Flore des*

Serres, viii. t. 735 (1855); *H. f. & T. Flor. Ind.* 254 (1855); *Walp. Ann.* iv. 171 (1857); *H. f. & T. Flor. Brit. Ind.* i. 119 (1872) *excluding in all cases the citation Wall. Cat. 8123/b and the Nepal locality.*

This is the pale-blue-fl'd. paniculate "Poppy" familiar to all travellers in Sikkim. Dr. King's Collectors have brought it also from Chumbi (Sham-Chen) and Dr. Cummins has sent specimens to Calcutta from Bootan (Dichu Valley) but though it thus extends further to the east than the *F. B. I.* indicates it has not as yet been collected in Nepal. The plant has long been cultivated in Europe, seeds having first been sent home by Sir Joseph Hooker in 1848 and plants having been reared at Kew by Sir William Hooker who figured and described the species. Sir William identified with this the paniculate form of Dr. Wallich's yellow-flowered Nepalese species which is often remarkably like this pale-purple-fl'd. plant, until ripe fruit is obtained. There is however no possibility of confounding the capsules of the two—those of *M. Wallichii* are smaller and narrower with 5–6 valves, with spreading rufous setae and a longer slender style; the yellow-fl'd. plant has longer widely-ovate capsules with 8–11 valves, setae that are less patent and that remain yellow throughout and a shorter style much thickened at the base. One result of the identification of these two plants has been that the *Meconopsis* named in Dr. Wallich's memory is one that he never collected or distributed.

§ 3. PRIMULINÆ. *Stems very short simple, leaves and sepals glabrescent; ovaries glabrous (in a Chinese species strigose at apex); stigmas cleft or 2-lobed; leaves simple entire, radical few vanishing, cauline numerous close-set and pseudo-radical; flowers Sanguinarioid i. e. with 6–9 petals.*

9. (—.) MECONOPSIS PRIMULINA Prain; almost glabrous, stem short leafy at the base only, leaves linear-oblong entire acute, radical few spathulate, all narrowed into short petioles and very sparsely strigose on both surfaces flowers on a terminal and one to two axillary scapes pendulous dark violet-purple; sepals 2 glabrous, petals 6–8 imbricate narrowly ovate with a distinct claw; stamens about 50, filaments filiform as long as the ovary, anthers orbicular-ovate golden-yellow; ovary glabrous 4-carpelled narrowly ovate tapering into a slender style $\frac{1}{3}$ as long; stigmas 2-partite lobes oblong plano-convex, outer convex surface 2-stigmatic.

BOOTAN: Do-lep, *King's Collectors*! CHUMBI: Sham-Chen, *Dungboo*!

Rootstock fusiform 1–4 in. long, neck clothed with old sheaths; leaves $1\frac{1}{2}$ – $2\frac{1}{2}$ in. by $\frac{1}{4}$ in.; central scape 7 in., lateral 3–4 in.; sepals $\frac{1}{2}$ in., petals $\frac{3}{4}$ in. long, $\frac{1}{4}$ – $\frac{1}{2}$ in. wide, inner narrower; filaments of the outer series often united into petaloid phyllomes with antheriferous fringe; ovary $\frac{5}{8}$ in. long, $\frac{3}{16}$ in. wide, placentas far intruded and passing up the substance of the style as 2 pairs of approximated traces, each trace bearing at the base of the style a projecting papilla laterally inclined so that the 4 papillæ are in 2 pairs alternate with placental traces and style lobes and opposite the stigmatic cleft, outer stigmatic loops alternate with placentas. The capsules though apparently full-grown are unripe.

The nearest ally of this species is *Meconopsis Henrici*, Franchet [*Journ. de*

Botanique v. 19 (1891,] from Szechuen which has more numerous leaves, also close-set on a short stem and not truly radical, more numerous stouter scapes and rather larger flowers that though nodding in bud are not nodding when full-blown. *M. Henrici* has however a very different ovary which is depressed globose, strigose in its upper half and considerably shorter than the style. In *M. Franchet's* species the same peculiar grouping of the filaments of the outer series in flat phalanges is also sometimes met with but there are no epaulettes of papillæ on the capsule. Another species in which the leaves and stems are exactly like those of *M. primulina* is *Meconopsis lancifolia* Franchet, from Yunnan. This has a glabrous ovary and short style and except in wanting the epaulettes and having a less deeply lobed stigma hardly differs from *M. primulina*. The flowers too are almost identical but instead of having a few flowers on long scapes, it has numerous flowers arranged in a racemose cyme with the pedicels bractless as in *M. horridula* VAR. *racemosa*, while the sepals are slightly and the stem and pedicels are rather densely strigose.

Another Yunnan species of this group is *Meconopsis Delavayi* Franchet, of which the flowers are exactly as in *M. lancifolia*, *M. Henrici* and *M. primulina* but which has solitary scapes and crowded very long-petioled pseudo-radical leaves with small spatulate-hastate blades.

§ 4. *Grandes.* *Stemless or with simple stems, leaves and sepals softly hairy; ovaries hispid; stigmas large capitate ridged; leaves simple entire (in the Chinese) or dentate (in the Indian species), radical very numerous persisting, cauline, if present, few scattered below, whorled above; flowers Sanguinarioid i.e. with 5-8 petals.*

10. (—.) *MECONOPSIS GRANDIS* Prain; softly hairy, radical leaves tufted numerous ovate-lanceolate coarsely serrate, tapering into a long petiole; cauline leaves shortly petioled or sessile; flowers large very deep blue; ovary subcylindric sparingly covered with harsh spreading ultimately subdeciduous hairs; placentas 5, slightly intruded; style $\frac{1}{3}$ the length of ovary; capsule linear-oblong.

SIKKIM: Jongri, in Western Sikkim, very common at 10-12,000 feet, *King's Collectors! Watt* n. 5435! *G. A. Gammie!*

Rootstock stout, clothed with sheaths, neck villous; radical leaves $3\frac{1}{2}$ -7 in. by 1-2 in. with petioles 6-9 in. long; stem $1\frac{1}{2}$ -3 ft. high leafy, leaves passing into bracts, the lower 1-3 scattered, the upper 3-5 collected in a whorl, lowest shortly petioled vacant, the next 1-2 with axillary flower-buds: bracts of the whorl subequal 5-6 in. by 3 in. with 1-2 axillary flowers; main axis terminating in a 1-fl. scape extending 6-18 in. beyond whorl; sepals 2 hairy, petals 5-7 imbricate, buds $1\frac{1}{2}$ in., flowers 5 in. diam.; stamens ∞ ; capsules $2\frac{1}{2}$ in. long, seeds rugose.

This one of the finest species of *Meconopsis* in the Himalayas, is evidently, in spite of its great difference of habit, very closely allied to *M. simplicifolia* with which it agrees in having tufted coarsely dentate radical leaves and of which it has exactly the capsules and the seeds. It is also nearly related to *Meconopsis integrifolia* Franchet [*Bull. Soc. Bot. Fr.* xxxiii. 389 (1886) et *Plant. Delavay.* 41 (1889); *Maxim. Flor. Tangut.* i. 35 t. 9. f. 7-12 et t. 22. f. 23-25 (1889); *Cathcartia integrifolia* Maxim *Bull. Ac. Imp. Petersb.* xxiii. 310 et *Mel. Biol.* ix. 713 (1876); *Forbes & Hemsl. Journ. Linn. Soc.* xxiii. (*Ind. Sinens.* i.) 34 (1886)] which agrees with *M. grandis* in having tufted radical leaves and in having a stem that, though

shorter, has also 1-2 scattered leaves below and a whorl of 5-8 bracts with 2-3 axillary as well as a terminal flower above, but which differs in having all the leaves entire, in having yellow in place of dark purple flowers, and in having a very short style with a rather larger stigma. Of the two, *M. integrifolia* is perhaps the more beautiful species; both must prove, when ultimately introduced, great acquisitions to European horticulture. *M. grandis* seems to be confined to the district of Jongri but is very plentiful there.

11. (—.) *MECONOPSIS SIMPLICIFOLIA* Walp. *Rep.* i. 110 (1842); *H. f. & T. Flor. Ind.* 252 (1855); *Hook. f., Ill. Him. Pl.* t. 8 (1855); *Ill. Hort.* iii. 114 (1856); *Walp. Ann.* iv. 170 (1857); *Flore des Serres* xiii. t. 1324 (1858); *Flor. Brit. Ind.* i. 118 (1872). *Papaver simplicifolium* D. Don, *Prodr. Fl. Nepal.* 196 (1825) *Stylophorum simplicifolium* Spreng. *Syst.* iv. cur. post. 203 (1827); G. Don, *Gen. Syst.* i. 135 (1831). *Wall. Cat.* n. 8125.

The species most nearly related to *M. simplicifolia* is *M. quintuplinervia* Regel [*Gartenfl.* (1876) 291, t. 880, f. b. c. & d.; *Maxim. Flor. Tangut.* 34. t. 23. f. 27 (1889)] from Northern Tibet and Kansu. *M. quintuplinervia* differs from the Himalayan species in having entire leaves, filaments sub-2-seriate those of the outer rather shorter series being moreover slightly dilated upwards. A second closely allied species is *M. punicea* Maxim. [*Flor. Tangut.* 34. t. 23. f. 12-21 (1889)] which also differs from *M. simplicifolia* in having entire leaves but is further easily distinguished from both *M. simplicifolia* and *M. quintuplinervia* by having much longer and narrower petals and by having a short globose ovary with a much larger almost sessile stigma.

§ 5. Bellæ. *Stemless; scapes, leaves, sepals and ovaries glabrous, stigmas small capitate; leaves 2-3-pinnatifid all radical numerous persisting, flowers sub-Papaveroid, i.e. petals 4 or 5.*

12. (—.) *MECONOPSIS BELLA* Prain, *Journ. As. Soc. Beng.* lxiii., pt. 2, 82 [*Noviciæ Indicæ* vii. 71] (1894).

This species is, as already mentioned in this work, very distinct from any hitherto reported *Meconopsis* and represents a group not very closely related to any of the preceding. This also, when ultimately introduced, must prove a great acquisition to European horticulture.

4. (—.) *RŒMERIA MEDIK.*

Annual herbs with yellow juice; leaves petioled pinnatipartite with multifid lobes; flowers in cymes, on slender leaf-opposed pedicels; sepals 2, petals 4 violet-purple, with a dark basal eye; stamens numerous; ovary linear, stigmas 2-4-lobed sessile; rays opposite the many-ovuled placentas. *Capsules* elongated, 3-4-valved, 1-locular, dehiscing throughout their length; seeds scrobiculate, without crests. Species 2; Mediterranean and Oriental.

Key to the Indian Species.

* Capsule uniform, setose; filaments filiform ... 1. *R. hybrida*.

* * Capsule narrowed upwards, glabrous; filaments dilated 2. *R. refracta*.

The area occupied by *Rœmeria* is the conjoined Mediterranean and Oriental regions so that only the merest fringe of their area comes within the limits of the Indian Empire. Like *Papaver* therefore *Rœmeria* is not really an Indian genus. The nearest natural allies of its species are the prickly-capsuled members of *Papaver* § *Rhœades* from which they only differ in having valves that dehisce throughout instead of by pores. By this character *Rœmeria* approaches *Cathcartia* and that so closely that, as originally defined, *Cathcartia* differs only from *Rœmeria* in having crested seeds and differently coloured flowers. A new *Cathcartia* from Sikkim, however, agrees with *Rœmeria* in both characters; but for the presence of a style, not admitted in the original definition, in the species of *Cathcartia*, that genus must have been merged in *Rœmeria* from which it therefore only differs by the character that separates *Meconopsis* from *Papaver*. The place usually assigned to *Rœmeria* in taxonomic works is close to *Chelidonium* and *Glaucium*; the arrangement is neither natural nor convenient.

1. *Rœmeria hybrida* DC. *Syst. Veg.* ii. 92 (1821); leaves pinnatifid to -sect; filaments subulate; capsule uniformly patently setose.

VAR. *eriocarpa* DC. *Syst.* ii. 93 (1821); leaf segments oval oblong, flowers small. *R. pinnatifida* Boivin in *Belang. Voy. Ic.* t. 2 (1838). *R. orientalis* Boiss. *Ann. Sc. Nat.* ser. ii. xvi. 374 (1841); *Flor. Orient.* i. 118 (1867). *R. Schimperii* Presl., *Bot. Bemerk.* 8 (1843). *R. hybrida* VAR. δ . *H. f. & T. Flor. Ind.* 257 (1855); *Walp Ann.* iv. 174 (1857).

NORTH-WEST FRONTIER: British Beluchistan; *Hamilton! Duke! Duthie! Lace!* DISTRIB. (of species) Westward to Spain: (of variety) Beluchistan, Afghanistan and Persia to Egypt.

Flowers 1 in. in diam. Capsules 1–2 in. long more or less copiously setose alike on placental ribs and valves. The variety hardly differs from the typical *R. hybrida*, which in the true Mediterranean region is itself very variable, except in the shape of the leaf segments and the smaller size of flowers and fruit.

All the specimens from British territory belong to this variety, which Boissier and others treat as a species. If so dealt with it should however be noted that the oldest name is not Boissier's one of *R. orientalis*, but Belanger's one of *R. pinnatifida*. The oldest name for the species as a whole is *R. violacea* Medik [*Ust. Ann.* iii. 15 (1792)] but that employed by DeCandolle being in more general use I have continued its employment.

2. *Rœmeria refracta* DC. *Syst. Veg.* ii. 93 (1821); leaves 2-pinnatifid segments linear; flowers large filaments dilated; capsule narrowed at the tip, glabrous. *Delessert, Icon. Select.* iii. t. 8 (1823); *DC. Prodr.* i. 122 (1824). *R. rhœadiflora* Boiss. *Diagn.* ser. i. vi. 7 (1845); *Flor. Orient.* i. 119 (1867). *R. hybrida* VARS. β . γ . *H. f. & T. Flor. Ind.* 257 (1855); *Walp. Ann.* iv. 174 (1857).

NORTH WEST HIMALAYA: Badakshan, *Giles!* DISTRIB. Afghanistan, Beluchistan, Turkestan, Persia, Armenia.

Flowers 2 in. in diam. Capsules 1–2 in. long, without setae on the valves, sometimes with a few along the placental ribs.

When M. Boissier in 1845 first defined *R. rhæadiflora* he considered it a species apart from *R. refracta*; the only character, however, by which he could diagnose his species was that its pedicels did not turn down. There is however no character to separate the two and M. Boissier admits this when in the *Flora Orientalis* he includes under *R. rhæadiflora* the solitary gathering (Derbent, Steven!) on which the species *R. refracta* was founded! By an oversight, however, he omits to cite the name that DeCandolle had already given to the specimens of this gathering, or to merge his own later name in it. The writer, who has examined both Steven's, and therefore DeCandolle's, as well as Boissier's original specimens is satisfied that Boissier is right in considering the two conspecific. And a note by Stocks, on the specimen in Herb. Calcutta of the gathering from Beluchistan identified by Boissier with *R. rhæadiflora*, shows that that botanist had already recognised the identity of Boissier's species with *R. refracta* DC.

5. (—.) GLAUCIUM TOURNEF.

Biennial or perennial glaucous herbs with yellow juice. Radical leaves rosulate petioled, cauline more or less amplexicaul incised or lobed. Peduncles axillary or terminal 1-fl'd. Sepals 2; petals 4, orange-yellow convolute, stamens numerous; ovary linear; stigma 2-lamellate sessile, lamellae erect, alternate with the placentas and projecting at each end so as to form conjointly two horizontal arms stigmatic above, opposite the placentas. Capsule a slender cylindric pseudo-siliquea, valves dehiscing throughout their length and leaving a pseudo-replum resulting from union of margins of intruded placentae, in which the seeds are semi-immersed. Seeds scorbiculate without crests. Species about 15; throughout the Mediterranean, Oriental and Central Asian regions.

Key to the Indian Species.

- * Pods slender, not much thicker than peduncles, slightly torulose, contorted or irregularly curved, rarely straight 1. *G. elegans*.
- * * Pods stout, nearly twice as thick as peduncles, not torulose, straight or only slightly regularly bent ... 2. *G. squamigerum*.

Like *Rœmeria* and *Papaver*, *Glaucium* is not a truly Indian genus. The difficulty of distinguishing satisfactorily the different forms has led in various taxonomic works to a great diversity of treatment. In the *Flora Orientalis* M. Boissier has distinguished thirteen *Oriental* species; in *Acta Hort. Petrop.* (1887) Dr. Kuntze has proposed the extreme measure of reducing all the forms to one very variable species *Glaucium corniculatum*. Doubtless the truth lies somewhere between these two extremes. M. Boissier was an author of the greatest care and of the highest judgment and the various forms that he describes are at all events recognisable. And though it is possible to some extent to justify the view of Dr. Kuntze when the genus is looked at from the monographer's stand point, it is not necessary or advisable to adopt it when dealing with the flora of a given area. Besides, an examination of Kuntze's work does not leave the impression that he appreciates the value, even for varietal differentiation, of the characters exhibited by the varieties and sub-

varieties which he recognises. Kuntze's later proposal, that the name *Glaucium*, owing to its similarity to the name *Glaux* (*Primulaceæ*), must give place to another, is mere pedantic trifling with a subject that has some claim to serious treatment.

1. *GLAUCIUM ELEGANS* Fisch. & Mey. Ind. Sem. Hort. Petrop. i. 29 (1835); glabrescent, radical leaves obovate-oblong pinnatifid, lobes shortly ovate crenately toothed; cauline cordate-amplexicaul broadly ovate obtusely toothed; sepals papillose, petals small orange with red eye; capsule slender, torulose, often contorted, sparingly setose with spreading prickles, seeds oblong-cylindric curved. H. f. & T., Flor. Ind. 255 (1855); Boiss. Flor. Orient. i. 120 (1867). *G. pumilum* Boiss. Ann. Sc. Nat. ser. ii. xvi. 374 (1841). *G. squamigerum* Bunge, Rel. Bot. Lehm. 192 (1847); Boiss. & Buhse, Aufzähl. (1860); nec Kar. & Kir.

NORTH-WEST FRONTIER: Kohat, at Mirkhorli, Drummond!
DISTRIB. Afghanistan, Turkestan, and N. Persia to Armenia.

Stems 1 ft. or higher, slender much branched, radical leaves $1\frac{1}{2}$ –2 in., sepals $\frac{1}{2}$ in. long, buds $\frac{1}{5}$ in. diam.; flowers 1 in. diam.; capsule usually twisted 2–3 in. long, narrowed (subtorulose) between the seeds.

2. *GLAUCIUM SQUAMIGERUM* Kar. & Kir. Bull. Soc. Mosc. xv. 141 (1842); glabrescent, radical leaves lyrate-pinnatifid, lobes ovate wide toothed, terminal subquadrate; cauline cordate-amplexicaul, broadly oblong acutely lobed; sepals glabrous, petals orange-yellow; capsule straight or curved, sparsely setose; seeds reniform deeply pitted. Regel & Herd. Bull. Soc. Mosc. xxxvii. 406 (1864). *G. persicum* Bunge, Rel. Bot. Lehm. 192 (1847) nec DC. *G. corniculatum* H. f. & T. Flor. Ind. 256 (1855) nec Linn. *G. luteum* var. *fimbrillifera* Trautv. Bull. Soc. Mosc. xxxiii. 92 (1860). *G. fimbrilligerum* Boiss. Flor. Orient. i. 120 (1867).

NORTH-WEST HIMALAYA: Badakshan, Giles! N.-W. FRONTIER: Kach, Lace! Nal, Duke! DISTRIB. Beluchistan, Afghanistan, Turkestan, Soongaria.

Stems 1 ft. or higher, branching; radical leaves, 2–6 in., sepals $\frac{3}{4}$ in. long, buds $\frac{1}{4}$ in. or less in diam.; flowers $1\frac{1}{2}$ –2 in. diam., petals bright yellow (*Aitchison*); capsule usually slightly curved, 6–8 in. long; adpressed aculeate, flattened (scale-like) setae ultimately suberect.

Glaucium elegans is perhaps one of the most distinct of the forms in this troublesome genus where all the forms are somewhat variable and seem to pass one into the other. *G. squamigerum*, on the other hand, is, so far as Afghan and Beluch specimens are concerned, most like *G. arabicum* Fresen. from Sinai, which in turn much resembles and is perhaps only a geographical form of *G. corniculatum*. As represented in Herb. Kew, Herb. Boissier and Herb. DC., *G. fimbrilligerum* Boiss. and *G. squamigerum* Kar. & Kir. would appear to be specifically separable but a fine suite of specimens from Turkestan in Herb. Paris shows that they pass into each other and that it is not possible to separate them even varietally.

6. (3.) CATHCARTIA HOOK. F.

Key to the Indian species (incorporating the new forms).

- * Stigma large, style very short; flowers large, stamens numerous (32); a softly hairy plant with (cordate lobed leaves and) rounded yellow petals ... 1. *C. villosa*.
- * * Stigma small, style distinct, flowers small, stamens definite (16); glabrescent herbs with narrow pale-purple petals:—
 - † Leaves hastate-entire to lyrate-pinnatifid; petals ovate-lanceolate, obtuse, apex subfimbriate ... 2. *C. lyrata*.
 - † † Leaves ovate-lanceolate; petals lanceolate, acute, apex entire ... 3. *C. polygonoides*.

A purely E. Himalayan genus only separable from *Meconopsis* by the character of capsule dehiscing by valves from apex to base. As originally described the genus was supposed to have no style. There is however even in the original species a distinct, though short, style.

1. CATHCARTIA VILLOSA Hook. f. *Bot. Mag.* t. 4596 (1851); *Flore des Serres* vii. t. 686 (1851); *Lemaire, Jard. Fleur.* ii. t. 167 (1852); *H. f. & T., Flor. Ind.* 254 (1855); *H. f., Ill. Him. Pl.* frontisp. (1855); *Walp. Ann.* iv. 175 (1857); *H. f. & T., Flor. Brit. Ind.* i. 119 (1872.)

This has been obtained in Eastern Nepal as well as in Sikkim by Dr. King's Calcutta collectors.

2. CATHCARTIA LYRATA Cummins & Prain; glabrescent, rootstock slender clothed with sheaths; stem slender glabrous; radical leaves few early withering, cauline 3-4 from hastate-entire to lyrate-pinnatifid sparingly hirsute on both surfaces; flowers small, blue, solitary or in few-fl. cymes; style distinct; stigma small 2-3-lobed; seeds smooth without crests.

SIKKIM HIMALAYA; 13-14000 feet, not common; Ta-ne-da King! Chiani, Phallut, and Jongri, King's Collectors! Tankra, G. Gammie! near Gnatong, H. A. Cummins!

Stem 3-10 in. simple or sparingly branched; *leaves* $\frac{1}{2}$ -1 $\frac{1}{2}$ in. by $\frac{1}{4}$ - $\frac{3}{4}$ in., radical disappearing, cauline petioles $\frac{1}{2}$ -1 $\frac{1}{2}$ in. *Flowers* 1-3 (usually solitary), *sepals* glabrous, buds $\frac{1}{4}$ in. diam. nodding; full blown flowers 1 in. diam.; pedicels very slender, petals narrowly to widely lanceolate rounded or obtuse rarely acute always fimbriate at the margin. *Stamens* 16, in 2 rows of 8 each; *placentas* 2-3, distinctly intruded. *Capsules* 1 $\frac{1}{2}$ in. long, very slender, erect, valves membranous.

The complete elaboration of this interesting little species which has puzzled Indian botanists since 1877 when it was first obtained by Dr. King, is largely due to the efforts of Surgn.-Capt. Cummins of the Medl. Staff who met with it when stationed at Gnatong in 1893, and who has assisted the writer in preparing a description. The ripe fruits show that it is undoubtedly a *Cathcartia*; the valves dehisce to the base while the stigmatic rays are opposite the placentas. It differs however from the original *Cathcartia villosa* in having ripe seeds without a crested raphe, in having a distinct style, and a much smaller stigma. It must prove

a welcome addition to western horticulture when its seeds are at length introduced to Europe.

3. *CATHCARTIA POLYGONOIDES* *Prain*; glabrescent, rootstock slender clothed with sheaths; stems slender strigose; radical leaf solitary persisting long-petioled, cauline leaves 2-3, lower long-petioled uppermost sessile clasping, ovate-oblong obtuse base cuneate, truncate or slightly cordate, margins entire or slightly incised crenate, sparingly hairy on both surfaces; flowers small blueish-white; style distinct, stigma small 2-3-lobed.

CHUMBI: Sham-chen, *Dungboo!* Put-lo and Ling-moo-tong, *King's Collectors!*

Stem 6-15 in. simple; *leaves* $1\frac{1}{2}$ -2 in. by $\frac{1}{2}$ - $\frac{3}{4}$ in.; radical petioles 3 in., lower cauline petioles 1-4 in. long. *Flowers* solitary 1 in. diam. nodding, pedicels long slender; *petals* narrowly lanceolate apex acute margin entire; *stamens* 16 in 2 rows of 8 each; *placentas* 2-3.

The flowers and unripe capsules of this plant are so remarkably like those of *C. lyrata* that there would seem no room for doubt as to its generic position. But it is at the same time remarkably like a small form of a plant from Yunnan described by M. Franchet as *Meconopsis betonicaefolia* [*Plantae Delavayanae*, 42, t. 12 (1889)] of which it has all the habit and, though on a smaller scale, exactly the foliage. A final judgment on both *Cathcartia polygonoides* and *Meconopsis betonicaefolia* can therefore only be given when ripe fruit of both plants has been received. The specific differences between the two plants are the fewer (16) stamens in the Chumbi plant than in the Yunnan one, which has 64; the narrower much smaller petals; and the smaller ovary and stigma. As regards stigma *Meconopsis betonicaefolia* more nearly approaches *Cathcartia villosa*, but (like the two species now described) it has a long style; it has also more stamens (64 in 2 rows of 32 each in place of 32 in 2 rows of 16 each as in *C. villosa*). The ovary and unripe capsules of *Meconopsis betonicaefolia*, *Cathcartia lyrata* and *C. polygonoides* are remarkably similar; knowing that one of them is a *Cathcartia* the writer thinks it possible that the other two may eventually prove to be members of the same genus.

7. (4.) CHELIDONIUM TOURNEF.

Perennial glaucous herbs with yellow juice. Radical leaves petioled few erect or many rosulate, cauline few scattered, or 0, floral 0, or 2 terminal subopposed, or several near apex scattered. Flowers in fascicled or corymbose cymes. Sepals 2, petals 4, yellow or orange, convolute, stamens numerous, ovaries linear rarely ovate, 2-(rarely 3-4)-valved; style distinct stigma 2-lamellate lobes erect alternate with placentas, sinuses not projecting into arms. Capsule slender cylindric, rarely ovate, valves dehiscing throughout their length. Seeds shining smooth or opaque pitted, not scrobiculate, raphe crested. Species 9; 7 Chinese, of which 1 (*C. japonicum*) extends to Japan, another (*C. majus*) occurs also in Japan, Mongolia and Dahuria, extends westward to Britain and is naturalised in N. America; 1 North American; 1 Himalayan.

In the *Flora Indica* (1855) Sir J. D. Hooker and Dr. Thomson founded a genus *Dicranostigma* on the Indian species here dealt with. This species (*Dicranostigma lactuoides*) was however subsequently referred to *Stylophorum* by Mr. Bentham and Sir J. D. Hooker [*Gen. Pl.* i. 53 (1862)], by M. Baillon [*Hist.* iii. 114 (1871)] and again by Sir J. D. Hooker and Dr. Thomson [*Flor. Brit. Ind.* i. 119 (1872)]. More recently Messrs. Prantl and Kundig have suggested [*Engler, Natur. Pflanzenf.* iii. i. 139 (1891)] that *Dicranostigma* should rather be referred to *Hylomecon* Maxim. [*Prim. Fl. Amur.* 36, t. 3 (1858)] a genus founded on a plant that was originally [*Thunbg, Flor. Japon.* 221 (1784); *Sieb. & Zucc. Abh. Acad. Muench.* iv. ii. 169 (1846)] referred to *Chelidonium*, but that was at a later date [*Miquel, Prolus. Flor. Japon.* 199 (1867)] included in *Stylophorum*; this genus Mr. Prantl would reinstate. The view expressed by Prantl and Kundig is undoubtedly more tenable than that of the other authors quoted; at the same time if the method of limitation adopted by them be accepted it would be more advisable to retain *Dicranostigma* also as a genus. In any case the name of the conjoint genus suggested by Prantl and Kundig must be *Dicranostigma*, not *Hylomecon*. But the species in question, formerly very inadequately known, has been recently communicated by Mr. Duthie from Kamaon (its original locality) and by the collectors of the Calcutta garden from Phari in the Eastern Himalaya. A study of these specimens and of the material of the allied groups *Stylophorum* and *Hylomecon*, preserved in the national Herbaria at Kew and at the Jardin des Plantes, Paris, shows however that it is impossible to accord generic rank to any of them, or to separate them satisfactorily from each other or from *Chelidonium*. A detailed review of the species belonging to this widened *Chelidonium* will be found in the *Bulletin* of the Boissier Herbarium.

1. CHELIDONIUM DICRANOSTIGMA Prain. *Dicranostigma lactuoides* H. f. & T. *Flor. Ind.* 255 (1855); *Walp. Ann.* iv. 272 (1857). *Stylophorum lactuoides* Baill. *Hist. Pl.* iii. 114 (1871); H. f. & T. *Flor. Brit. Ind.* i. 119 (1872).

N.-W. HIMALAYA: Kamaon, *Strachey and Winterbottom* n. 3! *Duthie* nn. 2699! 3819! 5326! EASTN. HIMALAYA: Phari, *King's Collector*!

Nearly allied to *Chelidonium Franchetianum* Prain [in *Bull. Herb. Boiss. ined.*] and *C. leptopodium* Prain [*Glaucium leptopodium* Maxim. *Mel. Biol.* ix. 714 (1876)], which belong equally to the section *Dicranostigma*. From both it differs in having large stigmatic lobes, softly hairy capsules, and simple cymes. The section to which these species belong differs from the remaining *Chelidonia* in having a glaucioid habit—i. e., radical leaves many rosulate, cauline 0, floral apical all scattered.

On a new species of RENANTHERA.—By G. KING and D. PRAIN, Royal Botanic Garden, Calcutta.

[Read July, 3rd.]

Some years ago Lieutenant E. J. Lugard sent to the Calcutta Herbarium, for identification, some dried flowers and a living plant of what was evidently a species of *Renanthera*. The living plant unfortunately soon died in the uncongenial climate of Calcutta; the dried flowers were, however, sufficient to show that the plant probably belonged to a species near *R. coccinea*, Lour. Last year Lieutenant J. B. Chatterton was kind enough to send several plants of the same orchid to the Calcutta Garden, which were promptly transferred to the more suitable climate of the Cinchona Plantation in Sikkim. These plants flowered a few weeks ago and there is now no doubt that they belong to an undescribed species which from the resemblance of its flowers to the extended wings of a brilliantly coloured butterfly we now name *R. Papilio*. For a description of the flowers, drawn up from living specimens, we are indebted to Mr. R. Pantling, of the Cinchona Plantation, who has also made a beautiful coloured drawing of the plant.

RENANTHERA PAPILIO, n. sp. King and Prain. *Leaves* loriform, 2 to 2·5 in. long and about ·5 in. broad; their apices blunt and unequally lobed. *Inflorescence* 9 to 10 inches long, laxly racemose, or rarely paniced, on stalks of about equal length or longer, the bracts small, the stalked ovary about 1 in. long. *Dorsal sepal* linear-oblong, contracted below the blunt sub-cucullate apex, ·75 in. long. *Lateral sepals* twice as long as the dorsal, narrowly elliptic, flat, with undulate edges, the inner margins touching above the slender twisted claws; the apices sub-acute and divergent. *Lateral petals* ·5 in. long, spathulate, slightly incurved. *Lip* with acuminate-side lobes each with a small rounded basal auricle, the middle lobe broadly ovate, concave, its apex acute and pointing forwards, the base auricled. *Spur* short and blunt, with two erect toothed divergent plates near its mouth. *Column* minutely ciliate behind the anther; *stigma* with a thin deflected transparent lip.

Assam.

The colour of the flowers is a brilliant scarlet with a tinge of lake. The toothed plates of the spur end abruptly at the base of the middle lobe of the lip and immediately in front of their termination there are three blunt tooth-like processes. In its habit and the colour of its flowers the species resembles *R. coccinea*, Lour., but the flowers are larger and the lobing of the lip and the shape of the lateral sepals are very different.

On some New Orchids from Sikkim.—By G. KING and R. PANTLING.

The publication, in Sir Joseph Hooker's *Flora of British India*, of his account of the Orchids of the Empire marks an era in the study of this most interesting Natural Family. Prior to the issue of Sir Joseph's account of the group, it was extremely difficult to identify any Indian orchid that did not happen to have had a figure of itself published in some horticultural or botanical work. Now the work of determining the name of a species has been made comparatively easy; and the facilities which have thus been provided have stimulated local research. In the present paper we offer to the Society descriptions of thirty-three new species—twenty belonging to the Tribe *Epidendreæ*, eight to the Tribe *Vandææ*, three to the *Neottieæ*, two to the *Ophrydææ*—which have been discovered in Sikkim within the past few years.

Epidendreæ.

MICROSTYLIS, Nutt.

MICROSTYLIS MAXIMOWICZIANA, n. spec. *Rhizome* 2 to 4 in. long, with scattered root fibres and bearing a leafy pseudo-bulb 3 or 4 in. long. *Leaves* 4 or 5, elliptic to elliptic-lanceolate, acute, tapering to the sheathing base, slightly oblique, 5 to 6 in. long. *Raceme* about 6 in long with numerous green flowers nearly .2 in. in diam., the stalk of the raceme 4 to 5 in. long. *Floral bracts* linear-lanceolate, equal to or exceeding the stalked ovary. *Sepals* oblong, blunt, their margins recurved, the lateral broader than the dorsal. *Petals* linear, all reflexed, the lip hood-shaped; its apex contracted, thickened and slightly crenate, and with two minute teeth above the pit; the side lobes sub-falcate, blunt. *Arms* of the *column* broad, overlapping and hiding the anther, the stigma occupying the whole face of the column. *Lip* of anther truncate.

Sikkim: On the Mungpoo Cinchona Plantation, alt. 2,000 to 4,000 feet; flowers in July.

The species is self-fertile.

OBERONIA, Lindl.

OBERONIA FALCATA, n. spec. *Stems* caulescent, tufted, 3 in. long. *Leaves* falcate, acute 1 to 2 in. long, and .25 in. broad. *Racemes* almost sessile, erect, 2 to 3 in. long; the flowers yellowish-green, minute, very numerous and sub-verticillate. *Flower-bract* ovate, erose, equal to and sheathing the stalked ovary. *Sepals* broadly ovate, entire, reflexed. *Petals* linear-oblong, blunt, entire. *Lip* twice as long as

the sepals, broadly oblong, flat except for a slight depression below the column; the side lobes short, subulate, spreading; the apex deeply bifid, the lobes oblong-acute, slightly divergent at their apices. *Column* with two fleshy wings. *Anther* membranous; the pollinia ovate, flattened and of a dark orange colour.

Sikkim: at Labha, elevation about 6,000 feet? In flower in July. (Both locality and elevation are however doubtful).

This belongs to same group as *O. caulescens*, Lindl. and *O. Wightiana*, Lindl.

OBERONIA LONGILABRIS, n. spec. *Stems* caulescent, slightly tufted, erect, slender, 2 to 3 in. long. *Leaves* narrowly ensiform, acute, 1 to 1.5 in. long, and .2 in. broad. *Racemes* slender, 2.5 to 3.5 in. long, nodding; their stalks .5 to 1.25 in., ebracteate. *Flowers* minute, rather sparse, green. *Bract* lanceolate, erose, much exceeding the stalked ovary. *Sepals* ovate, entire. *Petals* linear, blunt. *Lip* oblong, three times as long as the sepals, with two small rounded lobes at the very base, the apical lobes broadly lanceolate, sub-divergent, acute, the sinus apiculate, the surface of the lip with a lanceolate depression extending from near the sinus to the column and there becoming deeper. *Column* with small stout wings. *Pollinia* orange.

Sikkim: at Songchongloo, elevation 6,000 feet; in flower in July.

A species near *O. caulescens*, Lindl.

OBERONIA MICRANTHA, n. spec. Acaulescent, height of whole plant 2.5 inches. *Leaves* narrowly-ensiform, sub-acute, .5 to 1.5 in. long, and from .1 to .15 in. broad. *Racemes* about 1.25 in. long, on very short bracteate stalks. *Flowers* numerous, very minute, verticillate. *Bracts* linear-lanceolate, erose, equal to or slightly exceeding the ovary. *Sepals* broadly ovate, entire, spreading, minutely papillose externally. *Petals* narrower than the sepals, ovate, entire, recurved. *Lip* in general outline sub-rotund divided into a basal and apical part by deep lateral sinuses: the basal part concave, fleshy, its edges almost entire; the apical part transversely elliptic, thinner than the basal, with an acute apiculus and irregularly erose-dentate edges.

Sikkim: at Tendong, elevation 6,000 feet; in flower in July.

The nearest allies of this very distinct little species are *O. myriantha*, Lindl. and *O. demissa*, Lindl.

OBERONIA PARVULA, n. spec. Acaulescent, not tufted or very slightly so: the height of the whole plant 1.25 to 2 in. *Leaves* two or three, .5 to nearly 1 in. long, and .12 to .25 in. broad, lanceolate, acute. *Raceme* .75 to 1 in. long, on a slender stalk about half as long. *Flowers* very minute, densely crowded, not verticillate. *Bract* lanceolate, as long as the stalked ovary. *Sepals* ovate, entire, the laterals larger

and wider-spreading than the dorsal, and keeled. *Petals* linear, truncate, shorter than the sepals, entire, pale yellow and transparent like the sepals. *Lip* reddish brown, with broad reniform base having a lateral sinus and a short convergent horn at each side at its anterior end: the apical lobe broadly oblong, deeply bifid, the lobes lanceolate and slightly convergent, and the sinus narrow, not triangular and with a concave emarginate apex. *Stigma* concave.

Bhotan: at Guru-bathan, at an elevation of about 1,500 feet; in flower in February.

A very distinct species.

OBERONIA LOBULATA, n. spec. Acaulescent, not tufted. *Leaves* about four, large, oblong, sub-acute, 1.25 to 3 in. long, and .4 to .5 in. broad. *Raceme* 4 in. long, on a winged ebracteate peduncle about half as long, much decurved. *Flowers* distant, minute, green. *Bracts* broadly oblong, the apex convex and minutely erose equalling and sheathing the sessile ovary. *Sepals* ovate, acute, entire, reflexed; the *petals* similar but narrower. *Lip* broadly triangular with irregularly erose margins, the apex with a broad shallow sinus and two short blunt lobes. *Stigma* convex?

Sikkim: in the valley of the Teesta, at an elevation of about 1,000 feet; in flower in October.

Collected only once. A remarkable species with the pollinia encased within the anther cells and not free as is usually the case in the genus *Oberonia*.

OBERONIA PRAINIANA, n. spec. Acaulescent, and slightly tufted. *Leaves* very fleshy, falcate, sub-acute, .5 to .75 in. long, and .25 in. broad. *Raceme* slender, many times longer than the leaves, erect, 4 in. long: stalk of the raceme attached to the uppermost leaf, minutely bracteolate, filiform, about 1 in. long. *Flowers* of a warm brown colour, verticillate, very minute. *Bract* oblong, sub-entire, equal to and embracing the stout sessile ovary. *Sepals* oblong, blunt, all much revolute. *Petals* elliptic-lanceolate, spreading, deeply serrate. *Lip* triangular-oblong with a circular nectar-bearing pit near its base and under the column, the apex blunt, the margins deeply erose-dentate. *Pollinia* 2 pairs, orange-coloured.

Sikkim: in the Teesta Valley, at an elevation of about 1,000 feet; in flower in July.

A very distinct species remarkable for the great length of the slender inflorescence in proportion to the leaves, and for its unlobed but deeply erose dentate lip.

DENDROBIUM, Swartz.

DENDROBIUM COESPITOSUM, n. spec. Pseudo-bulbs tufted, narrowly conical, from .5 to 1 in. long. *Leaves* linear-oblong; the apex sub-obtuse, minutely and obliquely emarginate, about 1.5 in. long and .25 in. broad. *Racemes* terminal 1 to 2 in. long, the rachis slender, minutely bracteolate, 8- to 12-flowered. *Sepals* and *petals* sub-equal, narrowly lanceolate acute, .25 in. long, slightly spreading. *Lip* slightly shorter, fleshy obovate-oblong, decurved at the base, otherwise flat, without lateral lobes, the margins ciliate near the base; disc much thickened and deeply 3-grooved; mentum concave. *Anther* papillose; *pollinia* thin.

Sikkim: in the Naru Valley, at an elevation of 6,000 feet; in flower in June.

This species belongs to the group *Stachyobium* and is allied to *D. alpestre*, Royle, but that species has a lip with incised-serrate lateral lobes, a small crisped terminal lobe, and a central bi-lamellate disc. It is also allied, but not so closely, to *D. ericeflorum*, Griff.

DENDROBIUM PAUCIFLORUM, n. spec. Stems 2 to 3 feet long, as thick as a goose-quill, branching, and tapering towards each extremity, pendulous, smooth when young but slightly grooved when old. *Leaves* linear-lanceolate, obliquely and minutely emarginate at the apex 3 to 4 in. long, and .5 to .75 in. broad. *Racemes* lateral about .5 in. long, 1-4-flowered; flower-bract ovate, blunt .1 in. long. *Flowers* .75 in. long. Lateral *sepals* ovate; the dorsal narrower, blunt. *Petals* ovate-lanceolate, ciliate. *Lip* .5 in. long, oblong, clawed: basal lobes narrow, directed forwards, fringed, the part between these lobes much thickened and bearing on its surface 3 raised lines; terminal lobe flat, hispid with no central thickening or lines; mentum with a large nectar-secreting chamber, its upper (posterior) portion partially covered by the wings from the sides of the column.

Sikkim above Engo, at an elevation of about 4,000 feet; in flower in June.

The flowers are of a golden yellow colour, the sepals and petals being broadly margined with crimson. The apical lobe of the lip is spotted with red. Its nearest ally is probably *D. sphegidoglossum*, Reichb. fil. The position of the basal lobes of the lip is so far forward that they are really not basal but lateral.

BULBOPHYLLUM, Thouars.

BULBOPHYLLUM CORNU-CERVI, n. spec. Pseudo-bulbs globular, touching, only .1 in. in diam. *Leaf* coriaceous, sub-sessile elliptic or elliptic-rotund tapering slightly to the base, 1 to 1.5 in. long and .6 to .8 in. broad. *Raceme* 1.4 to 1.75 in. long, on a sub-erect stalk rather longer

and stouter than itself and bearing at intervals a few minute bracteoles. *Flowers* rather distant, about .25 in. long. Dorsal *sepal* oblong, blunt, lying parallel to the column; the laterals broader, flat, with involute margins. *Petals* half as long as the sepals, lanceolate, 1-nerved (in fresh flowers). *Lip* fleshy, sub-rotund with lateral sinuses; the basal portion thick concave; the anterior portion thinner and much deflexed so that its upper surface is convex, the edges entire. *Column* very short, with stout 2-3-fid arms variable in shape; *mentum* flat, narrowing outwards, with a stout raised mesial line which begins as a hook at the lower margin of the stigma. *Anther* flat; *pollinia* small.

Sikkim: near the base of the Engo ridge at an elevation of probably about 2,500 feet: flowering in July.

The sepals of this are green with reddish-brown margins; the lip is yellow with a touch of dull red at the base. The nearest ally of this seems to be *D. alcicorne*, Par. & Reichb. fil.

BULBOPHYLLUM CLARKEANUM, n. spec. *Rhizome* long, about the thickness of a crow-quill, sending up at intervals of about an inch and a half, ovoid-globose obtuse pseudo-bulbs .35 to .6 in. long. *Leaf* narrowly elliptic, slightly notched at the apex, sessile, about 1 in. long and .5 in. broad. *Scape* .5 to 1 in. long, slender, with 3 to 5 small sheaths 2-3-flowered. *Flowers* .3 in. long, their pedicels .2 in. long, borne at the apex of the scape. *Sepals* sub-equal, lanceolate-acuminate, their apices thickened. *Petals* about one-third of the length of the sepals, broadly ovate, obtuse, 3-nerved. *Lip* ovate, acute, decurved, the upper surface convex with an elongated central pit; the edges thin erose. *Column* with long projecting spurs.

Western Dooar of Bhutan; in the Kumai Forest near the Jaldacca River, at an elevation of about 1,500 feet: flowering in June.

This is allied to *B. stenobulbon*, Par. & Reichb. fil., but has different pseudo-bulbs and leaves.

BULBOPHYLLUM CYLINDRICUM, n. spec. *Rhizome* long, creeping, .1 in. thick, with numerous sheaths towards the apex, bearing at distances of about two inches cylindric pseudo-bulbs truncate at the apex and 1 to 1.25 in. long. *Leaf* narrowly oblong, sessile, blunt, faintly notched at the apex, 2.5 to 3 in. long, and .4 to .5 in. broad. *Scape* about as long as the pseudo-bulb, slender, minutely bracteolate. *Flowers* 3 to 5, sub-umbellate, about .25 in. long. *Sepals* lanceolate, caudate-accuminate, the dorsal shorter than the laterals. *Petals* about one-fourth of the length of the lateral sepals, ovate, sub-acute, 1-nerved. *Lip* oval, blunt, flat, its margins thin, entire, much reflexed. *Column* very stout, with short spurs; *mentum* conical. *Anther* with a raised fleshy mid-area, its lip truncate; *pollinia* divergent.

Sikkim : Mungpoo, at an elevation of about 3,000 feet : flowering in June.

This is also closely allied to *B. stenobulbon*, Par. & Reichb. fil. of which it has the leaves and pseudo-bulbs, but the flowers are different. It is likewise allied to *B. Clarkeanum*.

BULBOPHYLLUM EBULBUM, n. spec. *Rhizome* .15 in. thick, smooth, bearing leaves at distances of three or four inches. *Pseudo-bulbs* none. *Leaves* with long petioles, the blades oblong-lanceolate, tapering to base and apex, about 7 in. in length and 1 to 1.25 in. broad : *petiole* 1.5 to 2 in., channelled. *Raceme* erect, rising immediately in front of a leaf, many-flowered, about 3 in. long, its stalk about half as long, bracteate. *Flowers* rather distant, .25 in. long. *Sepals* lanceolate, acuminate, (1-nerved ?), the dorsal shorter. *Petals* linear-lanceolate, 1-nerved, half as long as the lateral sepals. *Lip* oblong, stipitate, deflexed from the middle, blunt, entire, longer than the lateral petals. *Column* stout, with mentum twice as long as itself and bearing a large swelling below the stigma. *Anther* thickened down the centre, entire.

Sikkim : at Sivoke, elevation 1,000 feet ; in flower in July.

The nearest ally of this is undoubtedly *B. apodum*, Hook, fil. from which it is however well separated by the shape of the leaf, and the non-auriculate lip.

BULBOPHYLLUM LISTERI, n. spec. *Pseudo-bulbs* oblong-ovate, compressed, .35 in. long, arranged alternately and close together on a thread-like rhizome. *Leaf* fleshy, linear-oblong ; sub-acute, sessile, 1 to 1.5 in. long. *Flowers* .125 in. long, solitary from the bases of both old and new pseudo-bulbs, and much shorter than the latter, the shortly-stalked ovary enveloped by several shrivelled bracts. *Dorsal sepal* ovate-lanceolate, blunt ; the laterals a little longer, cohering by their lower margins nearly to the tips and forming a kind of trough in which the lip lies, their margins ciliolate. *Petals* fleshy, ovate, erose at the apex, minutely ciliolate in the middle. *Lip* lanceolate almost flat, the apex alone slightly decurved, the base constricted into a short claw, the upper surface with a thickened yellow mesial line. *Column* very short, its spurs long, slender, up-curved. The galeate *anther* with a filiform attachment to the column.

British Bhotan : at the Rumpti Lake, elevation 1,000 feet : flowering in March.

This remarkable species was discovered by Mr. J. L. Lister, of the Bhotan Cinchona Association, who gave it to Mr. Pantling. It is one of the most curious in the whole genus. The flowers are of a dull lake.

CIRRHOPETALUM, Lindl.

CIRRHOPETALUM DYERIANUM, n. spec. *Rhizome* .1 inch thick. *Pseudo-bulbs* ovoid-globose, .35 to .5 in. long, touching or from .25 to .5 in. apart. *Leaf* fleshy, elliptic, blunt, sessile. *Scape* 2.5 in. long, filiform, pendulous, bracteolate only at the base, bearing 3 or 4 rather distant racemose flowers .65 in. long, each with a lanceolate acuminate basal bract equally the slenderly pedicelled ovary. *Dorsal sepal* ovate, acute, the laterals two and a half times as long, linear-oblong, acuminate, slightly oblique, and somewhat incurved at their apices but not cohering. *Petals* equal to the dorsal sepal in length, ovate, acute, erose. *Lip* narrowly triangular with a deep mesial groove to near the apex. *Column* with short up-curved spurs; *mentum* twice as long as the column. *Anther* minutely papillose.

Sikkim: on the summit of Tendong, elevation 7,000 feet; in flower in August.

CIRRHOPETALUM SARCOPHYLLUM, n. spec. *Rhizome* .15 in. thick, bearing at intervals of 3 or 4 inches small flat disc-like pseudo-bulbs, .35 in. in diam. *Leaf* 4 to 9 in. long, pendulous, very coriaceous, oblong-lanceolate, sub-falcate, without visible nerves, contracted at the base to a thick cylindric petiole .75 to 1 in. long. *Scape* 3 or 4 in. long, pendulous, with a few equidistant ovate-lanceolate acute sheathing bracts .25 in. long and bearing at its apex an umbel of 3 to 7 shortly stalked flowers .75 in. long. *Dorsal sepal* ovate-acuminate .35 in. long, the laterals narrower, and twice as long, cohering for one-third of their length, free at the tips, glandular-puberulous. *Petals* oblong, falcate, acute .2 in. long. *Lip* tongue-shaped, channelled below. *Column* with slender divergent spurs with a smaller tooth at the base of each: *mentum* stout with two parallel central raised lines. *Lip* of *anther* recurved. *Pollinia* cuneate.

Sikkim: at Rishap, elevation about 2,500 feet; in flower in September.

The flowers are purplish speckled with yellow.

CHRYSOGLOSSUM, Blume.

CHRYSOGLOSSUM MACROPHYLLUM, n. spec. *Pseudo-bulb* sub-cylindric, thin, 6 in. long. *Leaf* plaited, oval, slightly narrowed at base and apex, 15 in. long and 7 in. broad: its petiole 8 in. long. *Raceme* about 6 in. long, many-flowered, its stalk about 12 in. long, sparsely bracteolate: *Flowers* .5 in. across, their ovaries .5 in. long, bracts lanceolate, reflexed, shorter than the ovaries. *Sepals* sub-equal, the dorsal lanceolate, the laterals falcate. *Petals* slightly broader than the sepals, falcate. *Lip* contracted into a claw at the base, mobile, oblong, abruptly decurved from

the rounded basal lobes, the apex minutely emarginate and decurved: upper surface with two bold longitudinal minutely hispid lamellae running from the base to nearly the apex where they unite. *Mentum* half as long as the entire column. *Anther* with two projecting triangular wings. *Pollinia* 2, attached to a small viscid disc.

Sikkim: in the Chel valley, at an elevation of 4,000 feet; in flower in May.

This differs from any *Chrysoglossum* known to us in having a wingless column. The flowers have an unpleasant smell.

ERIA, Lindl.

ERIA FIBULIFORMIS, n. spec. *Pseudo-bulbs* crowded and often overlapping, much depressed, reticulate, .5 in. in diam. *Leaves* membranous, in pairs, oblanceolate, sub-acute, sessile, the edges minutely ciliolate, 1.75 in. long. *Flowers* in pairs, .25 in. long, their ovaries short, sigmoid, sub-campanulate. *Sepals* united to form a 2-lipped beaked sac, gibbous at the base. *Petals* oblong-lanceolate, sub-acute, obliquely curved, not quite so long as the calyx, their apices connivent above the very small lip, (1-nerved?). *Lip* half as long as the petals, clawed at the base, its upper surface concave, the side lobes broad and rounded, the part beyond them contracted and with laciniate edges, the apex carunculate, a small retrose callus in front of the basal claw. *Mentum* twice as long as the column, tapering downwards. *Rostellum* very large and resting on the two lobes and upper margin of the stigma. *Anther* crested and tuberculate, its lip erose. *Pollinia* 8, barely cohering by their minute membranes.

Sikkim: in tropical valleys at the base of the hills, at Sivoke, &c.: in flower in October.

This belongs to the section *Porpax* and is allied to *E. Lichenora*, Lindl. and *E. ustulata*, Par. & Reichb. fil. Its sepals are united to form a curious 2-lipped sac, sparsely hispid externally. All parts of the flower are of a uniform dull red colour.

TAINIA, Blume.

TAINIA HOOKERIANA, n. spec. *Pseudo-bulbs* ovoid, tapering upwards, 2 to 3 in. long, rising close together from a stout rhizome, and enveloped in a bract which sheaths also the petiole nearly to its apex. *Leaf* plicate, oblong-lanceolate, tapering much to each end, 12 to 18 in. long and about 3 in. broad, its petiole somewhat shorter. *Raceme* about 10 in. long, its stalk about twice as long, glaucous, bearing two or three sheathing bracts near the base: floral bracts lanceolate, .25 in. long. *Flowers* about 1 in. long, their ovaries .75 in. *Sepals* and

petals sub-equal, lanceolate, acuminate. *Lip* oblong with rather large blunt incurved side-lobes and a dilated sub-reniform apex apiculate in the centre; upper surface of the middle of the lip with 3 ridges which, beginning at the base as lines, pass into converging lamellae towards the apex; spur blunt, incurved, exceeding the sepals by .12 in. *Column* winged. *Anther* with two bosses.

Sikkim; in the valley of the Teesta at an elevation of 1,000 feet; in flower in March.

The colour of the sepals and petals is greenish with brown lines: the lip is white, and its lamellae are yellow spotted with pink. The anther is pink and its bosses are dark red. The species is near to *T. viridifusca*. We have dedicated it to Sir Joseph Hooker.

CALANTHE, R. Br.

CALANTHE TRULLIFORMIS, n. spec. *Leaves* linear-lanceolate, acute, sessile, 9 to 12 in. long. *Raceme* about 9 in. long; its stalk about the same length, puberulous. *Flowers* 14 to 18, scattered, about 1 in. in diam.; floral bracts linear-lanceolate equal to or exceeding the stalked puberulous ovaries. *Dorsal sepal* ovate-lanceolate, narrowly acuminate .75 in. long; *lateral sepals* lanceolate, falcate, longer than the dorsal. *Petals* linear, acute, shorter than the lateral sepals. *Lip* sessile, trowel-shaped, the base entire, the sides irregularly crenate-dentate, not lobed; the apex acuminate, entire: the upper surface with two converging lamellae extending from its base midway to the apex: *spur* short, stout; its mouth triangular, its interior bristly. *Pollinia* in 4 clavate unequal pairs.

Sikkim: on Mahaldaram Peak: elevation 6,000 feet; flowering in in July.

A species allied to *C. puberula*, Lindl. but differing from that species in having sessile leaves and a lip without side lobes. The colour of the sepals and petals is brown with a mesial and marginal green lines. The lip is white, with a triangular pink mark at the base.

Vandææ.

EULOPHIA, R. Br.

EULOPHIA GENICULATA, n. spec. *Leaves* about three and a half feet in length of which the petiole forms one-third, the blade linear-lanceolate, acute, plicate. Flowering *scape* about 18 in. long, clothed throughout with sheathing bracts 1 to 3 in. long, and bearing at its apex a 6- to 8-flowered raceme. *Flowers* 1 in. in diam., each with a lanceolate acute bract equalling the sub-sessile, cylindric ovary. *Dorsal sepal* elliptic, blunt: the two lateral elliptic-lanceolate, sub-acute.

Petals oblong, blunt, shorter than the sepals, connivent over the column. *Lip* oblong, with long shallow side-lobes, its body as far as the end of the side lobes with three to five parallel thickened nerves which end beyond the extremities of the side-lobes in a carunculate area on the truncate apical lobe: spur geniculate, short. *Anther* with a small 2-lobed lip.

Sikkim: in the valley of the Teesta: elevation about 1,000 feet: flowering in August.

The sepals of this are brown, the petals and lip pale yellow. The petioles of the two leaves form a pseudo-stem rather shorter than the scape, and they are enclosed within two sheaths about 9 inches long. This pseudo-stem is bound to the scape near its base by two short broad sheaths which originate from the tuber. The nearest ally of the species is *E. lachnocheila*, Hook. fil.

CYMBIDIUM, Swartz.

CYMBIDIUM MUNRONIANUM, n. spec. Terrestrial. *Leaves* stiff, erect, ensiform, 16 to 20 in. long and .75 in. broad, tapered into a petiole or not. *Racemes* stout, erect, about one foot long, about half being stalk, with two or three distant closely embracing sheaths 1 in. long. *Flowers* about 7 or 8, distant, 1 in. in diam., their bracts .25 to .35 in. long, lanceolate. *Sepals* and *petals* sub-equal, oblong-lanceolate, acute. *Lip* lanceolate (when flattened out), everywhere concave on the upper surface; the lateral lobes elongate and shallow, the body with two parallel smooth lamellæ in its centre ending with the side-lobes, the apical lobe narrow and reflexed. *Pollinia* 4, plano-convex, the gland narrow.

Sikkim: in the Teesta Valley on dry knolls: at an elevation of 1,500 feet: flowering in May.

The flowers of this species are sweetly-scented: the sepals and petals are straw-coloured and each has 5 dotted or streaked lines: the lip is white except its apical lobe, which is pale yellow transversely blotched with red. Its nearest ally is *C. ensifolium*, Swartz, under which it appears to be included by Lindley and other authorities. This Sikkim plant appears to us to differ very materially from the true Chinese *C. ensifolium*. We have dedicated the species to the late Mr. James Munro, for many years resident in Sikkim, and well-known, not only as a lover of plants, but as a man of great sincerity, and of unlimited kindness and hospitality.

CYMBIDIUM SIMONSIANUM, n. spec. *Leaves* linear, sessile, the apex acute and sub-oblique: length 3 feet or more: breadth .4 in. *Raceme* 8 in. long, pendulous, shortly stalked, sheathed at the base by large

imbricate bracts 1 to 2·5 in. long. *Flowers* about 10 to 12, sparse, their bracteoles very short. *Sepals* sub-equal, linear, slightly wider near the apex, about 1 in. long. *Petals* rather shorter than the sepals, connivent round the column. *Lip* with long shallow erect blunt entire side-lobes parallel with, and as long as, the column; the apical lobe ovate, apiculate, deflexed; lamellæ of the lip 2, stout, parallel, clothed with glandular hairs, ending abruptly with the basal lobes but continued partly into the apical lobe as thickened lines. *Pollinia* falcately ovoid, compressed; the gland large.

Sikkim: in the valley of the Teesta: elevation about 1,000 feet. Assam: locality unknown; flowers in August.

The flowers of this species are sweet-scented: the sepals and petals are white with a crimson central line; the lip is also white, but has oblique crimson lines on the lateral lobes, with large blotches of the same colour on the apical lobe: the column is of a very dark crimson, and the anther of a pale yellow colour. Specimens of this plant were sent many years ago from Assam by the late Dr. J. C. Simons, to whom the Calcutta Herbarium is indebted for numerous contributions of plants, and for a large number of drawings of orchids. The species is now dedicated to his memory.

CYMBIDIUM GAMMIEANUM, n. spec. *Leaves* linear, slightly narrowed to the base, the apex acute, 2 to 3 feet long and about ·75 in. broad. *Raceme* pendulous, about 12 in. long with a stalk about three-fourths as long, laxly or densely-flowered, the bracteoles minute, the stalk enveloped in large imbricate sheaths 3 to 4 in. long. *Sepals* linear-lanceolate or linear-oblong, 7-nerved, 1·5 to 1·75 in. long and about ·45 in. broad. *Petals* linear-oblong, sub-falcate, slightly shorter than the sepals, 7-nerved. *Lip* about as long as the sepals, oblong, the side lobes shallow, elongate, acute, the apical lobe sub-orbicular undulate, puberulous, separated from the lateral lobes by a sinus; lamellæ of the lip 2, pubescent, parallel, but meeting and ending abruptly with the side lobes opposite the ciliolate sinus. *Column* slender, slightly winged. *Capsule* 2 in. long.

Sikkim: at elevations of from 5,000 to 7,000 feet: flowering in September and October.

The colour of the flowers in this species is a dirty yellow: the lip is of a brighter yellow and has brown lines on its side lobes. Individuals with flowers of a paler yellow are however very common, and these have usually densely-flowered racemes like *C. elegans*, Blume; while the plants with dirty yellow flowers have lax racemes suggestive of those of *C. longifolium*, Don. This species, although common in Sikkim; has hitherto remained un-named. We dedicate it to Mr.

J. A. Gammie, Deputy Superintendent of the Government Cinchona Plantation in Sikkim, whose work in the cultivation of the medicinal species of *Cinchona* and in the local manufacture of Quinine is so well-known and so highly appreciated. The species is allied to *C. Mastersii*, Benth. and *C. affine*, Warn.

SARCOCHILUS, R. Br.

SARCOCHILUS RETRO-SPICULATUS, n. spec. Leafless; the roots large, numerous and flat. *Scape* about .75 in. long, bearing at its apex 1 or 2 green, minutely bracteolate flowers .2 in. long. *Sepals* and *petals* sub-equal, linear-lanceolate, wide-spreading, the laterals inserted on the sides of the lip. *Lip* sessile, linear-lanceolate, the apex with a retrorse tooth; the base sub-gibbous, side lobes none: the spur globose, its mouth contracted. *Column* very short. *Pollinia* 4: the caudicle short, dilated below the pollinia, the gland ovate.

Sikkim: at elevations of about 5,000 feet; flowering in June.

A very inconspicuous species, remarkable for the curious retro-flexed apical spicule-like appendage of the lip.

SARCOCHILUS CREPIDIFORMIS, n. spec. A minute leafless plant with comparatively large spreading roots. *Raceme* erect, .35 in. long, flowers .15 in. long, bracteate, distichous, opening singly. *Sepals* sub-equal, ovate, blunt. *Petals* shorter than the sepals, lanceolate. *Lip* sessile on the column, forming a roundish cup with entire edges, about equalling the dilated horizontal spur which is pilose just inside its mouth. *Column* very short. *Anther* thin, with a slightly deflexed fleshy lip. *Pollinia* 4, all attached to a single thread-like caudicle: gland ovate. *Ovary* long, sub-sessile: *fruit* 1 in. long, cylindric.

Sikkim: in tropical valleys: flowering in September.

The sepals and petals of this curious little plant are greenish, the lip is white, and the stigma has purple margins. It is named from the resemblance of the combined lip and spur to a slipper or last.

SARCOCHILUS BIMACULATUS, n. spec. *Stem* very short. *Leaves* linear-oblong, narrowed to the base, sub-falcate, the apex obliquely bifid, 2 in. long, and .35 in. broad. *Raceme* stout, .75 in. long, compressed, and with persistent triangular bracts. *Flowers* confined to the upper half of the rachis, distichous, .3 in. in diam., sessile. *Sepals* sub-equal, ovate-lanceolate, apiculate, the laterals attached to the base of the column. *Petals* shorter than the sepals, ovate, sub-acute. *Lip* springing at right angles from a short mentum, and lying parallel to the column; its side lobes narrow, elongate, falcate, acute at the apex: apical lobe triangular, very fleshy and with two flat calli at its base where the side lobes end: the centre of the body of the lip with larger elongate calli

near its union with the mentum. *Stigma* large. *Rostellum* small. *Pollinia* ovoid, the caudicle oblanceolate; the gland very small, ovoid. *Capsule* 1.5 in. long, triquetrous.

Sikkim: in the valley of the Teesta; elevation about 1,500 feet: flowering in July.

The flowers are white, with two blotches of brown on the calli of the lip. They open singly and smell of almonds.

SACCOLABIUM, Blume.

SACCOLABIUM PSEUDO-DISTICHUM, n. spec. *Stems* slender, 6 to 9 in. long, slightly branching. *Leaves* fleshy, lanceolate, the apex finely and minutely bifid, .5 to .75 in. long, and .2 to .25 in. broad. *Peduncle* .35 in. long, sub-umbellately 5- or 6-flowered. *Flowers* .3 in. in diam. bracts minute. *Sepals* and *petals* sub-equal, oblanceolate-oblong. *Lip* with a wide hemispheric spur; side lobes absent; terminal lobe broadly cordate, blunt, entire, fleshy, concave, deflexed, quite without callus. *Column* very short. *Pollinia* 2, entire, ovoid-globose; gland deeply 2-lobed.

Sikkim: at elevations of 6,000 to 8,000 feet: flowering time August to October.

This grows along with *S. distichum* Lindl. to which it is closely allied. As in that species the sepals and petals are greenish or yellowish with purple spots; the lip in this is yellow, except the terminal lobe which is orange. The chief distinction between the two is to be found in the lip which, in this, is entirely without calli of any kind; while, in *S. distichum*, the lip has two large calli situated at its base. The times of flowering of the two are moreover separated by three months.

Neottieæ.

CHEIROSTYLIS, Blume.

CHEIROSTYLIS FRANCHETIANA, n. spec. *Roots* short tubercular. *Stem* 6 to 9 in. long, the nodes slightly swollen. *Leaves* few, scattered, glabrous; linear-lanceolate and much reduced in the flowering plant; in the young plant .25 to .35 in. long, ovate and shortly petiolate. *Raceme* pubescent, 1- to 2-flowered. *Flowers* .25 to .3 in. long, with ovate bracts shorter than the ovary. *Sepals* oblong, curved, connate for one-third their length; the dorsal concave, shorter than the laterals. *Petals* broad, sub-quadrate, with an oblique central nerve. *Lip* slightly exceeding the sepals, abruptly deflexed from a saccate base; the limb very shortly clawed, deeply divided into two linear obliquely sub-acute rather divergent lobes. *Column* with two pyriform processes

immediately beneath the rostellum. *Anther-beak* decurved. *Pollinia* sub-obovate, divergent when released from the anther; the caudicle acuminate and the gland oblong.

Sikkim: above Sureil; elevation 6,500 feet: flowering in August.

A very distinct species, named in honour of M. Franchet, the distinguished French Botanist who has so successfully elaborated the extraordinarily rich collections made by the Abbé Delavay in the highlands of South-Western China.

GOODYERA, R. Br.

GOODYERA HEMSLEYANA, n. spec. Height of entire plant 6 to 10 in. of which 3 in. are spike: roots few, thick. *Leaves* 3 to 5, scattered, unequal, broadly ovate, acute, glabrous like the stem, dark green with white nerves .8 to 1.8 in. long and .5 to 1 in. broad. *Flowers* subsecund, .5 in. long, the bracts equalling the ovaries. *Sepals* 3-nerved, white with pink lips, the laterals ovate-acuminate, the dorsal oblong-lanceolate and clothed externally with long sparse hairs. *Petals* oblong-lanceolate, falcate, 3-nerved. *Lip* oblong with a sharp tooth at each side of the mouth of the sub-saccate base; the limb oblong entire, obtuse, the lamellæ scabrid. *Column* beaked. *Pollinia* elongate-obovate, with a short caudicle and a long narrow lanceolate pointed gland.

Sikkim: on Senchal; elevation 7,000 feet: flowering in July.

This differs from *G. vittata*, Benth., notably by its laxly hairy sepals, and by the scabrid lamellæ of the lip. Dedicated to Mr. W. B. Hemsley, F.R.S., formerly Assistant for India, now Principal Assistant, Herbarium, Royal Gardens, Kew.

GASTRODIA, R. Brown.

GASTRODIA DYERIANA, n. spec. Rhizome short, twice as thick as the stem, horizontal, with slender spreading roots. *Stem* about the thickness of a crow-quill, 12 to 15 in. long, bearing sheathing bracts .5 in. long at intervals. *Flowers* 3 or 4 near the apex of the stem, .5 or .6 in. long, brownish, nodding. *Sepaline tube* cylindric, glabrous, the mouth 3-lobed. *Petals* minute, sub-rotund, entire, inserted on the sepaline tube near the bases of two of its sinuses. *Lip* as long as the column, but shorter than the sepaline tube, ovate-lanceolate, clawed, flat with undulate-crenate edges and with 4 parallel thickened lines from the base to nearly the tip: claw short, and bearing two sub-globular calli. *Column* with winged sides, the apex truncate and 4-toothed; *pollinia* narrowly and obliquely ovoid.

Sikkim: at elevations of 7,000 feet; flowers in August.

This is allied to *G. exilis*, Hook. fil., but that species has smaller

flowers with fimbriate (or glandular) lateral petals and a lip with 2 long wing-like central lamellæ. This is less closely allied to *G. orobanchoides*, Benth., which has erect flowers and a ventricose sepaline tube. It agrees with *G. elata*, Blume, in having two callosities on the claw of the lip. Dedicated to Mr. W. T. Thiselton Dyer, F.R.S., C.M.G., C.I.E., Director of the Royal Gardens, Kew.

Ophrydeæ.

HABENARIA, Willd.

HABENARIA BIERMANNIANA, n. spec. Height of plant 9 to 15 in.; tubers cylindric-ovoid, 1.25 in. long, sparsely hairy. *Leaves*, 4 or 5, cauline, scattered, amplexicaul, lanceolate, acute, boldly nerved, 2 to 3 in. long. *Spike* 4 in. long, rather sparsely flowered; bracts linear-lanceolate, acuminate, exceeding the sessile and scarcely beaked ovaries. *Flowers* .3 in. long. *Sepals* and *petals* sub-equal; *sepals* ovate, lanceolate, with oblique bases, concave, sub-acute, cohering and, with the triangular-lanceolate petals, forming a hood from the base of which the lip and spur projects. *Lip* fleshy, linear-oblong, tapering slightly to the obtuse apex, the side-lobes minute and tooth-like; spur about as long as the lip, curved, sub-obovate, dorsally compressed. *Column* arching over the mouth of the spur. *Caudicles* slightly shorter than the obovoid pollinia; gland short, linear-oblong.

Sikkim: on Sinchal; at an elevation of 8,000 feet: flowering in July.

A very distinct species dedicated to the memory of the late Adolf Biermann, for many years resident on the Government Cinchona Plantation in Sikkim, and who died as Curator of the Botanic Garden, Calcutta.

HABENARIA CUMMINSIANA, n. spec. Height of plant about 9 in. *Leaves* 2 to 4, unequal, crowded in the lower part of the stem with a smaller one a little below the spike, broadly elliptic to lanceolate, rather thick, 2 to 3 in. long and 1 to 1.5 in. broad. *Stem* angled between the small uppermost bract-like leaf and the base of the spike. *Spike* 3 in. long, rather densely-flowered, bracts longer than the slender beaked ovaries, their edges ciliolate. *Flowers* (to the tip of the spur) .75 in. long. *Dorsal sepal* ovate .25 in. long; the *laterals* narrower, wide-spreading, their edges ciliolate, .4 in. long. *Petals* fleshy, slightly exceeding the dorsal sepal, triangular, sub-falcate, the inner edge irregularly crenate near the base, the outer edge entire, the apex sub-acute, the base truncate. *Lip* very fleshy, without side-lobes, longer than the lateral sepals, almost cylindric, abruptly deflexed from the thin flattened base (? claw), the surface of the cylindric part slightly carunculate:

spur slender curved, longer than the ovary, slightly compressed laterally. *Column* very short: stigmas large, tapering towards the entrance to the spur. *Pollinia* cylindric, slightly clavate, rather longer than their caudicles and attached to them at half a right angle; gland small, subrotund.

Sikkim: at Gnatong; elevation 11,000 feet: flowering in July; collected by Mr. Pantling and also by Dr. Cummins; Surgeon to the detachment of troops stationed near the Thibet frontier, to whom we have dedicated the species.

This belongs to the section *Hologlossa* and is allied to *H. pachycaulon*, Hook. fil., but it is perfectly distinct from that species.

Contributions to the Theory of Warning Colours and Mimicry, No. I.
Experiments with a Babbler (Crateropus canorus).—By FRANK FINN,
 B.A., F.Z.S., *Deputy Superintendent of the Indian Museum.*

Not long after my arrival in Calcutta in October 1894, I commenced some researches on the common “warningly coloured” butterflies of the locality, in the hope of supplying some of that experimental proof of the unpalatability of such species, the insufficiency of which Professor Poulton (*the Colours of Animals*, p. 227) so justly deploras. My most complete experiments were made with the common Babbler *Crateropus canorus*, a representative and abundant insectivorous bird in India, whose habit of going about in small flocks is indicated by its native name of “sat-bhai” and the English ones of “Seven Brothers” and “Seven Sisters.” This bird, as it frequents trees and bushes, though often feeding on the ground in the open at a short distance from these, must constantly encounter butterflies in repose; that it often succeeds in capturing them on the wing I very much doubt, its weak clumsy flight being certainly most ill-adapted for such a performance. Though it can swallow whole butterflies of considerable size, it often transfers its prey to one foot, and thus holding it, easily picks off the wings. In confinement this species speedily becomes tame enough to feed from the hand, and will eat table scraps, boiled rice, &c., quite readily. So tame were some birds which I kept, that, when after being kept about a fortnight (some of them longer) they were released, they stayed about the compound for about three days, still willing to take insects from my hands. Thus I had an opportunity of checking the results of the experiments I had made on them during their incarceration—a piece of good fortune which has not so far, I believe, fallen to the lot of any previous experimenter.

As I intend to make this paper the first of a series, in which I shall record the results obtained by experiments with several more species of birds and with insectivorous animals of other groups, I refrain at present from drawing any general conclusions; such as can be drawn from the experiments given below will be perfectly obvious to any one who has studied this subject.

I have much pleasure, however, in here expressing my sincere thanks to Dr. Alcock, Superintendent of the Indian Museum, for the kind interest he has taken in my experiments. To him I owe the accommodation of a small aviary for some of my birds, and permission to use the services of the Museum collectors for obtaining insects—requisites indispensable for successful experiments.

I have also to record my obligations to Mr. L. de Nicéville, and to Mr. Barlow of the Museum staff, for assistance in naming the insects herein and after dealt with.

EXPERIMENTS WITH BABBLERS IN CONFINEMENT. SERIES A.

November 11th.—Offered various insects to four Babblers (*Crateropus canorus*) which I had just bought and placed in a large hutch, after I had given them some boiled rice, which they ate readily. They seized cockroaches (*Periplaneta americana*) and *Catopsilia* readily, squabbling over them, and one ate a *Terias* whole. They tackled two *Danaïs chrysippus* just as readily, and I thought I saw one swallowed; certainly there seemed no difference in their behaviour.

Later on in the day, giving the birds two more Danaids, they certainly seized and mauled them, but left them for a little while at any rate; and I found pieces of body and wing from the previous specimens. But these disappeared later. A *Delias eucharis* was torn to pieces, and some of the body at least eaten before my eyes.

November 12th.—The Babblers had still some rice left this morning; I took it away and gave them butterflies. I saw *Danaïs chrysippus* and *Delias eucharis* mauled and left, while of a specimen of a protectively-coloured species part at least was eaten. *Terias* to-day was pecked and left, and even the common Hesperid and a *Catopsilia* pecked about much; and though I believe they were eaten in part, I could not be quite sure.

November 13th.—This morning the Babblers had no food and were hungry when I came to them. They took and mauled three *Danaïs chrysippus*, but I saw none eaten; even one with the wings removed was left. One of them battered and partly at least ate a skipper. A larger skipper (*Tagiades*) was seized, mauled, and apparently eaten. A *Catopsilia* had its wings picked and knocked off and was eaten. A

Delias eucharis (minus abdomen) was mauled and left. A female *Hypolimnas misippus* was taken, and part at least was eaten. The birds take all butterflies one gives them and batter them a bit. Some of the *Danaids* may have eventually been eaten.

Next day I released these Babblers, not having got any very conclusive results from them. They did not seem very keen on butterflies, and were perhaps not healthy. Moreover it was difficult to observe them in a hutch.

EXPERIMENTS WITH BABBLERS IN CONFINEMENT. SERIES B.

December 11th.—A fresh Babbler confined alone pulled about an *Euproctis* moth for a time, but I found it left afterwards. I gave him separately an abdomen which he had knocked off, but did not see it eaten.

December 12th.—Babbler appeared to eat a bit of an *Euproctis* abdomen.

December 13th.—This Babbler, with another, and other birds being now in a small aviary, with $\frac{1}{2}$ inch-mesh netting, I saw one of them seize an *Euproctis*. A Babbler also pulled another of these insects to pieces, but did not eat it as far as I saw.

December 14th.—A Babbler ate a *Papilio demoleus** whole, but did not eat a *Danaïs chrysippus* and *Delias eucharis*, though descending from his perch to eat a *Catopsilia*.

December 15th.—The birds in the aviary being hungry, I put in some butterflies. I saw a Babbler eat a *Terias*. Later on, after the birds had had some food (meal moistened with water) I put in more butterflies, and saw a Babbler eat a *Danaïs genutia*, *D. chrysippus*, and *Delias eucharis*. Two *Euproctis* were eaten by Babblers. Two *Danaïs genutia* were seized and torn to pieces, and part of one was apparently eaten by the Babblers, which showed some signs of apparent dislike; of two *D. chrysippus* then given, one was torn up and eaten, and the other torn up and rejected, by a Babbler, which then took and left a *D. genutia* and *Delias eucharis*, and then went and ate some rice. After this I released the other birds in the aviary, as they had no chance with the Babblers. About this time I added a third specimen of the latter.

December 16th.—One of the Babblers took and ate nearly whole, after much rubbing and pecking, a caterpillar rather larger and much hairier than that of the Buff-tip (*Pygaera bucephala*). I think this is the larva of whose hairs I recently got my fingers full. The bird had

* *erithonius auctorum*.

food by it, and had had cockroaches in the morning. Another caterpillar, smaller, and covered with long whitish hair, with two pencils of hair near the head, was untouched.

December 17th.—A Babbler ate an *Euproctis* readily. The hairy caterpillar not eaten yesterday was still untouched, so I took it away.

December 18th.—The Babblers ate four specimens of *Euproctis*; they were hungry. They ate some *Catopsilia* and other non-warningly-coloured butterflies with relish, and ate also three *Danaïs genutia*; but only one of these was eaten directly by one and the same bird, and the others were evidently not relished much, for the birds ate *Papilios** of equal size much more readily. Specimens of a black beetle with yellow patches (*Mylabris* sp.) were taken, and the elytra got rid of, but the birds did not seem to like the body, and I saw one left.

December 19th.—The birds were hungry in the morning, and one ate a *Danaïs chrysippus* readily enough. Then a *D. limniace* was readily eaten. An *Euploea* was also eaten; the bird pecked it about on the ground much first, seeming especially to attack the yellow anal organ. A cockroach subsequently put in excited more competition than these butterflies, and caused a fight. Several *D. genutia* and *chrysippus* were then turned into the aviary, and two of the Babblers immediately attacked them. I gave them some *Euproctis*, and they ate some, I believe all, of them. By this time, too, they had torn all the *Danaïs* to pieces, and as I saw no bodies lying about, I presume eaten them, though they had now some plantain (a food they did not relish). In the evening an *Euploea* was eaten, though there was food in the cage.

Yesterday, I think, I put the hairy caterpillar which had previously escaped destruction, in again. It remained untouched for a day, and next morning I found it dead in the water. The birds seemed never even to look at it.

December 21st.—Two of the Babblers had been placed in the cage of a Bhimraj (*Dissemurus paradiseus*), and this bird put in the aviary with a Laughing Jackass (*Dacelo gigas*,) (not used in these experiments) and one Babbler. Another of the hairy caterpillars noted previously (*Dec. 16th*) as eaten by a Babbler remained untouched for some time, but afterwards I found it dead and deprived of its hair, but uneaten. I don't know which bird did this. I put a mixed lot of butterflies in the aviary, and saw the Babbler, which was hungry, three times take and eat a non-warningly-coloured butterfly in preference to *Danaïs chrysippus* and *D. genutia*, which it could easily have caught. Indeed, I saw it take and drop a *D. genutia*, and seize and eat a *Papilio** instead. It ate a grasshopper before any butterflies. At the end of the day two *Papilios* (one torn)

* Not *P. aristolochiæ*.

and most if not all of the warningly-coloured species were left, though the Babbler readily ate grasshoppers. Yet, when I gave an *Euploea* to the other two Babblers in the cage, one took and ate it whole, though they had had some grasshoppers, and did not eat some *Danaïs chrysippus* and *genutia* which I put in, so far as I saw.

Between this last date and January 3rd, I took, with one exception, no notes on the behaviour of the Babblers. I added during this time other specimens and had as many as twelve at once. However, I turned out three of these, and started the next series of experiments with nine birds, including the three used in the above series of experiments. I have a note for December 28th, on which date I gave the Babblers a small black and yellow zygaenid moth, which none touched, though some evidently saw it. The other birds had been removed.

Before beginning to take the systematic notes which follow, I had more than once given the birds butterflies, and had seen *Danaïs*, &c., devoured. I cannot give the exact dates of the experiments following, but they took place on and after January 3rd of 1895, on consecutive days for the most part. I have endeavoured to record each day's experiments separately. One and possibly two, of the present birds were young, but my notes are not quite clear on this point.

EXPERIMENTS WITH BABBLERS IN CONFINEMENT. SERIES C.

I. Put in, in the evening, first some grasshoppers, which were immediately devoured, then some butterflies (*Danaïs chrysippus*, *genutia* and *limniace*, *Euploea*, *Papilio aristolochiae* and some non-warningly coloured kinds). The *Danainae* were most numerous, and all were attacked, but the non-warningly-coloured species disappeared first. However, all the others but one *Danaïs genutia* and the *Papilio aristolochiae* were killed and more or less mauled, and some eaten. I saw one bird take and reject an *Euploea*, and another eat one. The *Papilio aristolochiae* was refused four times at least, and sometimes looked at and not touched. I then took it out. A very worn female specimen of *Elymnias undularis* was one of the first insects seized by the Babblers, as also were the *D. limniace*. There was food in the cage at the time.

II. The butterflies offered and partly left yesterday had disappeared this morning, with the exception of a few bits of wing, though there was still some food. In the evening I put some butterflies (one each of *Danaïs chrysippus*, *genutia*, and *limniace* and some other kinds), into an insect cage, and placing this in the aviary watched the result. One bird went in and took out a *Catopsilia*, which seems to be a favourite. Another (young) went in and took a female *Elymnias undularis*, though he could see its mimetic upperside; but he lost it. The three *Danaïs* were the last

left. Even two of these were ultimately taken, and I suppose eaten; I did not watch the whole process. The other, a *D. chrysippus*, was at the top of the cage, and possibly hard to get; I took it out. The young Babbler took, instead of a *Danaïs genutia*, a specimen of *Nichitonia xiphia*, which he seemed not to like. However, later on I could only find a few bits of wing left of all the butterflies I had put in, so I suppose it was eaten after all. The birds had had some grasshoppers first.

III. Put a *Danaïs genutia* into the aviary, where a Babbler took it and ate it whole. A *D. chrysippus* was taken by a Babbler, which was pulling off the wings with no great eagerness, when another took it away and ate the body. An *Euploea* (rather crushed) was eaten readily enough, with part of the wings, by a Babbler. I then put in several *D. chrysippus* and *genutia*, and the birds ate them all and fought over them. I saw one throw up a body two or three times before swallowing it. A *D. chrysippus* was first taken when I put in two of each kind (*D. chrysippus* and *D. genutia*) dead. The birds had had some grasshoppers some hours before. Some time afterwards I killed and put in—

- (a.) One each of *Danaïs chrysippus*, *genutia*, and *limniace*, *Euploea*, and *Catopsilia*. A bird snatched the *D. limniace* before I took my hand away, and the *Catopsilia* was not, I think, the next taken. The *Euploea* was swallowed whole.
- (b.) Two *D. chrysippus* and a large brown species put in; a bird first took the latter.
- (c.) The same two *D. chrysippus* were put in together with a *Junonia*. Two birds advanced at once and one took the *Junonia*, the other a *D. chrysippus*. The *Junonia* was eaten before my eyes, and I saw the other begun upon.
- (d.) I repeated this experiment with two *D. chrysippus* and another protectively-coloured specimen. This latter was taken by the first bird which came. About this time I saw a bird eat the body of a *Danaïs*, and soon found two lying about. The birds pecked but did not seem to care for them.
- (e.) I put in a *Catopsilia* and two *D. chrysippus*; two or three of the birds came at once. One took the *Catopsilia* and another a *D. chrysippus*.
- (f.) Put in a *Catopsilia* and one *D. chrysippus*. The first comer took the former, and immediately afterwards the latter was taken. The *Catopsilia* was eaten at once with some of its wings. The body of the other was eaten after some rubbing; I do not know whether the eater was the individual which took it.

(g.) Put in another *D. chrysippus* and a small fritillary, *Atella phalanta*. A bird took and ate the latter; the former was unregarded for a little time at least, then a bird took and ate at least some of it.

(h.) A Babbler took and pulled about a *Delias eucharis*, but then left it. I offered it again, and it was refused by a bird or two, though another appeared to eat part of it.

I then put in one *Danais genutia*, two *D. limniace*, and several *D. chrysippus*, which were immediately attacked as they fluttered about. All of these last mentioned were soon killed and torn to pieces, and I saw at least three eaten, though the birds had rice, &c., in the aviary.

IV. The birds had had no insects but a fly or two when I gave them (dead).

(a.) Two *Danais chrysippus* and one *Papilio demoleus*. The latter was taken first. I took the former away and

(b.) Presented them again with another *P. demoleus*. Two birds, one young, went for the *Papilio*; the older got it, and then the other bird took a *D. chrysippus*.

(c.) Put in two more *D. chrysippus* and a *P. demoleus*. A bird advanced and deliberately chose the latter.

(d.) Two more *D. chrysippus* and a *P. demoleus* were put in. The latter was taken first.

(e.) Same experiment repeated with same result.

(f.) One *D. chrysippus* and one *P. demoleus* put in; first comer chose the latter.

The birds did not seem to me very eager for the *Papilios*, though they so obviously preferred them. All the butterflies were eaten, or at least torn to pieces, and I saw no bodies lying about. There was rice in the food-bowl notwithstanding.

V. Offered the Babblers a *Papilio aristolochiae*; a bird took it and tore off the greater part of the wings, but left the body. Another took this and tore off the thorax, and left the abdomen. A *Danais limniace* was then eaten, at least most of the body, I think by one of the individuals which had refused the other.

(a.) Put in the aviary two *Danais chrysippus* and a *Papilio demoleus*. One of the former was first taken, then the *Papilio*.

(b.) The experiment was then tried with two *D. chrysippus* and a *Papilio polites*.* A *D. chrysippus* was first taken, then *P. polites* by a young bird.

(c.) Two *D. chrysippus* and a male *Elymnias undularis* were then put in. *E. undularis* was taken first and swallowed whole. These sets of butterflies were put in dead.

* *P. pammon auctorum*.

The Babblers then took and left two *Papilio aristolochiae*, though by this time all the Danaids and the *Papilio polites* were more or less torn up and eaten, the latter all but the wings, I think. One of the *P. aristolochiae* was not even killed at first. There was other food in the cage.

(d.) Offered the birds a *Danais chrysippus* and a *Catopsilia*. Two of them came at once, so I was not quite certain; but I think the latter was preferred.

(e.) Repeated the experiment with two *D. chrysippus* and one *Catopsilia*. The latter was distinctly chosen by the first comer.

(f.) Repeated the experiment with two *D. chrysippus* and a *Junonia*. The first comer (young bird) took a *D. chrysippus*, the second the non-warningly-coloured species.

(g.) Put in a *Junonia* and one *D. chrysippus*. One bird took one and another the other.

A Babbler took a *Papilio polites* readily. I saw no traces of the *P. aristolochiae* about by this time.

(h.) Offered the Babblers a *Papilio polites* and two *Danais chrysippus*. The two first comers took the latter; but the former was soon taken.

(i.) A *Papilio demoleus* and a *Danais chrysippus* offered. One bird came, and chose the former; but the *Danais* was soon taken.

(j.) One *Catopsilia* and one *D. chrysippus* were offered. The former was chosen by the first comer.

There was some rice still left in the vessel at this time.

VI. (a.) Offered to birds, in my hand, one specimen each of *Danais chrysippus*, *Papilio demoleus*, and *P. polites*. The last named was taken first, and then the *Danais*.

(b.) A protectively-coloured butterfly was offered in my hand to the birds, together with a *D. chrysippus*. The *Danais* was taken first.

(c.) A *Danais limniace* and a *Papilio demoleus* were offered; the latter was taken first.

(d.) A protectively-coloured butterfly (same species as above); again offered with a *D. chrysippus*. The *Danais* was taken first; it was nearest to the bird.

(e.) Same experiment repeated with another *D. chrysippus*; the *Danais* again taken first.

(f.) Same experiment repeated; this *Danais* was also taken first, though the other species was eaten readily by the next bird.

(g.) A small satyrid butterfly offered with *Danais limniace* in my hand. The former was taken first.

(h.) *D. limniace* and *Huphina phryne* offered. Former taken first, but latter eaten readily.

(i.) Same experiment repeated. This time *Huphina* was taken first.

(j.) Living specimens of *Danais chrysippus*, *D. genutia*, and *D. limniace*, *Euploea*, and *Delias eucharis*, together with two dead specimens of the last, put in. Many of these were attacked at once. The birds had no food by them this time.

VII. (a.) Offered to the birds *Papilio demoleus* and *Danais limniacé*, one of each. Former taken first.

(b.) Same experiment repeated with same result.

(c.) Experiment again repeated; same result.

(d.) Same species of *Papilio* offered with a female *Nepheronia hippia*; the *Papilio* was taken first. The upperside was of course exposed and the insects killed, as usual in these comparative experiments of mine.

The birds had food by them. They ate to-day one specimen of *Nichitonia xiphia*.

(e.) An *Euploea* and a *Papilio demoleus* offered; the former was taken first, but the latter swallowed nearly whole.

(f.) Experiment repeated; *Papilio demoleus* taken first.

(g.) Experiment again repeated; same result.

The *Papilios* were eaten more readily, usually whole, and apparently more relished.

(h.) Experiment again repeated; *P. demoleus* taken first, but the bird which took it did not seem very eager, and did not mind another robbing it of its prey. But it had had others.

(i.) Experiment repeated; *Euploea* taken first.

(j.) Protectively-coloured species offered with a *Danais limniace*; former chosen and eagerly eaten.

Two or three *Terias* were eaten to-day. A lot of *Danais* (*chrysippus*, *genutia*, *limniace*) and *Euploea*, and a few non-warningly-coloured specimens turned in. All were attacked, but the latter were eaten first, and with more relish, though some *Danainae* were swallowed whole.

VIII. (a.) Offered the birds one each of *Papilio demoleus* and *Danais chrysippus*. Both were taken almost simultaneously; the latter first if anything.

(b.) Offered, in my hand, one each of a *Catopsilia* and *D. chrysippus*. Former chosen.

(c.) Offered one each of a *Catopsilia* and *D. genutia*. The former was chosen, though another bird made a dash at the *Danais*.

(d.) Same experiment repeated; *Catopsilia* again chosen.

- (e.) Small brown Satyrid butterfly offered with *D. genutia*; former was deliberately chosen.

Some specimens of *Euploea*, *Danaïs chrysippus*, and *D. genutia*, were given alive, and immediately attacked by some of the birds.

Two *Papilio aristolochiae* were tried and left, while some of the *Danainae* above-mentioned were being torn and eaten, though some were still alive or uneaten. The birds had food by them at the time. Later on offered them —

- (a.) A *Danaïs genutia* and a brown Satyrid species. The first comer having a fair field, first took the former, and then dropped it and took the other.
- (b.) Last experiment repeated; two birds came at once, and the *Danaïs* was first taken.
- (c.) Offered a *Junonia* and a *D. genutia*; the former was taken first.
- (d.) Put in one *Catopsilia*, one *Danaïs chrysippus*, and two *Papilio polites* (one mimetic of *P. aristolochiae*, and the other not). The first comer deliberately chose the *Catopsilia*; the next looked at the remaining three and turned away; then a *P. polites* was taken, and I saw it swallowed nearly whole — I could not say whether by the same individual. The birds had food by them. None of the butterflies previously put in were to be seen. They did not seem very eager even for *Catopsilia*.

IX. Offered to the Babblers killed or disabled specimens as follows:—

- (a.) One *Danaïs chrysippus*, one *Catopsilia*. Former taken first.
- (b.) One *D. chrysippus*, one *Catopsilia*. Latter taken first, by young bird.
- (c.) Same experiment repeated; *Catopsilia* taken first.
- (d.) Same experiment repeated with same result.
- (e.) One *Danaïs genutia* offered with one *Catopsilia*. Latter deliberately taken first.
- (f.) One female of *Elymnias undularis*, one *Catopsilia*. Latter taken first. The mimic also taken and swallowed whole.
- (g.) *Papilio demoleus* and *Danaïs limniace*. Former taken first.
- (h.) Same species of *Papilio* and an *Euploea*. *Papilio* taken first.
- (i.) *D. chrysippus* and *Papilio polites*. Both of these were taken at once.
- (j.) Same experiment repeated. The first comer took neither, the second *Papilio polites*.
- (k.) Protectively-coloured Satyrid and *D. chrysippus*. Former taken first, and swallowed whole.

- (l.) Same experiment repeated. Protective species taken first, and eaten, by the same bird.

This bird again ate one of this Satyrid; though there were *Danaïs limniace* and *chrysippus* uneaten in the cage. A *Catopsilia* was then put in, and the same bird took and began upon it, when it was taken and soon swallowed by another.

Some *Danaïs genutia* and *limniace*, *Euploea*, and *Delias eucharis* were then thrown in, but though one or two birds pulled them about, I saw none eaten. The birds were now going to roost. They had had no insect food before on this day, but a number of cockroaches the day before.

X. Offered the birds —

- (a.) One *Danaïs chrysippus*, one *Catopsilia*. Latter chosen.
- (b.) One *D. genutia* one *Catopsilia*. Former chosen, by young bird.
- (c.) Same experiment repeated. This time the butterflies were on my hand, held on the floor; a bird swooped from the perch on the *Catopsilia*, and took it.
- (d.) Same two species offered. Both were taken at once.
- (e.) One protectively-coloured specimen, one *D. chrysippus*. Former deliberately taken.
- (f.) One *Huphina phryne*, one *D. chrysippus*. Former taken first.
- (g.) One *Papilio demoleus*, one *D. chrysippus*. Former chosen, but birds not eager.
- (h.) Same experiment repeated. As the first comer was hesitating, and seeming to prefer the *D. chrysippus*, another snatched the *P. demoleus*.
- (i.) One small protective Satyrid, one *D. chrysippus* offered. The first comer in the last experiment deliberately chose the former, though the *Danaïs* was nearer.
- (j.) *Papilio demoleus* offered with *Euploea*. Latter taken first.

Put in three *Euploea*s, one *Danaïs genutia*, one *D. limniace*. Last chosen deliberately by young bird. I threw in two more *Euploea*s and two *D. limniace*. The former were this time seized, but one bird soon left its prey, and I did not see the other specimen eaten, though I saw one *Euploea* swallowed whole.

In the afternoon of the following day I released these birds, which, as observed in the beginning of this paper, still continued about the place. Thus I was enabled to make the following experiments with them.

EXPERIMENTS WITH BABBLERS AT LIBERTY.

January 16th.—As the birds were hopping about the garden eating termites, &c., I gave them a number of butterflies, mostly dead or

disabled, comprising specimens of *Danaïs chrysippus*, *D. genutia*, *D. limniace*, and *Euploea*, with *Papilio demoleus*, *Huphina phryne*, *Catopsilia*, *Junonia*, &c. There was no doubt that these latter non-warningly-coloured species were preferred to *Danaïs* and *Euploea*. All as far as I saw were eaten, while though the *Danainae* were picked at, and I think one or two of them eaten, I often saw them looked at and then passed over in favour of a *Catopsilia* or other palatable species.

I offered two specimens of the female of *Nepheronia hippia*. The first one, which was displayed, was passed over by a bird in favour of a *Catopsilia*, though the same individual then tried and ate it. The second specimen, whose wings were half closed, did not seem to be noticed at first, but on being thrown to a bird it was picked up and eaten. I saw one bird, eating a *Catopsilia*, leave it and try a *Danaïs genutia*, and then return to its former prey. I saw one bird try unsuccessfully to catch an uninjured butterfly on the wing; decapitated specimens were caught with some trouble as they fluttered.

This day they four times refused a red, black and white bug (*Dysdercus* sp?). I thought *Euploea*s were least disliked of the unpalatable butterflies given.

January 17th.—This morning I found lying about wings of the butterflies rejected overnight; but these birds may not have eaten the bodies.

I put out several *Danaïs genutia*, which were not regarded with favour, though one or two were taken. A bird which had left one took and ate a skipper.

Another protective butterfly was eaten in preference to *Danaïs genutia* and *D. chrysippus*. A *Junonia* was eaten readily.

A male *Elymnias undularis* was eaten readily.

Two *D. genutia* were rejected, but a protectively-coloured species taken.

Some specimens of *Huphina phryne* were taken readily and eaten.

Two birds tried to catch a *D. genutia* on the wing.

A bird took a *Junonia* from my fingers and apparently ate it.

Another protectively-coloured species then taken.

Another attempt made to catch a flying *D. genutia*.

Two male specimens of *Elymnias undularis* taken in succession from my hand.

D. genutia was taken from my hand, but it escaped, and three birds tried to catch it.

Another protective species was taken.

A specimen of a protective species was taken, squabbled for, and eaten.

A protective species was again eaten; then a male *Elymnias undularis*, swallowed whole.

A *D. genutia* was allowed to remain perched on a shrub.

I did not see one *Danais* at this time eaten, though one *D. genutia* was torn up; but I found the body left. Afterwards, however, I saw one *Danais* (I do not know which species) eaten, and then a *D. genutia*; this latter was thrown up several times. Another was eaten; and then I had to leave the birds.

January 18th.—The birds were still about, though one seemed to be missing. I saw some *D. chrysippus* lying about, left from yesterday. In the morning I offered the Babblers a large brown moth and a cockroach, which were taken. The birds, however, did not seem to wish for some rice, &c., which I threw out, though such had formed their ordinary food in confinement, and they had eaten some the day before.

In the late afternoon I offered them some butterflies, mostly decapitated, chiefly *Danais genutia*, but also *D. chrysippus*, *D. limniace*, *Euploea*, and *Delias eucharis*. None of these were eaten, as far as I saw, as long as other species could be had, and only one, a *D. genutia*, afterwards. On the other hand, male *Elymnias undularis*, *Catopsilia*, and other non-warningly-coloured specimens were readily devoured, and even taken from my hand, while specimens of *D. genutia* fluttered about. A male *Nepheronia hippia* was taken and eaten. These experiments left not the slightest doubt in my mind as to the unpalatability of *Danais* and the other "warningly-coloured" forms. Birds would often only look at them, and soon left them when picked up.

Next day the birds had disappeared, and so ended my experiments with this species.



A list of the Butterflies of Sumatra with especial reference to the Species occurring in the north-east of the Island.—By LIONEL DE NICEVILLE, F.E.S., C.M.Z.S., &c., and HOFRATH DR. L. MARTIN.

[Received 1st; Read 7th August, 1895.]

The island of Sumatra, with Java, Borneo and Celebes, forms one of the Great Sunda group of islands. Rather more than half as large as Borneo and more than twice as large as Java, it is nearly as large as France. Some 1,070 miles in length, with an average breadth of over 120 miles, it has a total area of about 128,000 square miles, or 8,000 more square miles than are contained in the United Kingdom. Oblong in shape, with its longer diameter running north-west to south-east, the island lies between 95° and 106° Long. E., and is almost exactly bisected by the equator, six degrees north and south of which it extends. On the west it is washed by the great Indian Ocean with no adjacent land except a parallel chain of small islands of which Nias is the largest; to the east is the shallow Strait of Malacca, with the Malay Peninsula and the large island of Banka and a few other smaller ones at no great distance. To the south lies the large island of Java, separated only by the narrow Sunda Strait; to the north the Nicobar and Andaman chain of islands seem to form a natural continuation of the enormous volcanic range of mountains that beginning in the Banda Sea, extends through the islands of Wetter, Flores, Sumbawa, Lombok, Bali, Java and Sumatra, and ends in the Andaman Sea. Throughout the whole length of Sumatra extends a mountain-system of several parallel ranges, with large central plateaus or highlands. In this system, called "The Barisans," the highest mountains are mostly volcanoes, which reach an altitude of about 15,000 feet in Mount Kassoumba. Other lofty peaks are Indrapura, 12,255; Lusi, 11,000; Dempo, 10,562; Abong-Abong, 10,000; Ophir, 9,940; Merapi, 9,640; Talang, 8,470; and Salamanga, 6,825 feet. Two of these volcanic cones, Merapi and Talang, are said to be still active. On the west coast the mountains rise abruptly from the Indian Ocean, and in consequence there is no alluvial soil on that side of the island; whilst on the east coast there are large alluvial plains, abounding in water, and intersected by large rivers. This plain is increasing every year, being gradually built up by a broad belt of mangrove-swamp. In the northern half of Sumatra in the above-mentioned alluvial belt, between 3° – 4° N. Lat. and 98° – 100° E. Lon., are situated the three small Malayan sultanates of Langkat, Deli, and Serdang (with the butterfly fauna of which this paper deals), that are world-renowned for the splendid tobacco grown there, which is almost entirely used for making the outer covers of cigars. The southern

and western borders of these sultanates are formed by the Barisans, here named the Battak mountains from the inhabitants of these ranges being several tribes of anthropophagous Battaks, the aborigines of Sumatra. The different ranges of the Battak mountains here include the extensive Toba highlands, which surround the large and for long mysterious Lake Toba that lies in their centre. North of this lake is the Karo plateau, inhabited by the Karo-Battak tribe, and forming the true "hinter-land" of the above-named sultanates. The northern boundary of this region—as we deal chiefly with this part of the island, we will call it "our area"—is the mountainous land of the Gayoe and Allas tribes, who are Mahomedans; to the east lies the large sultanate of Siak. The altitude of the Karo plateau may be estimated at about 4,000 feet; the highest peaks of the Battak mountains are Simanabum, nearly 8,000 feet in height, and Sebayak, which is a little over 7,000 feet.

Owing to its situation, protected on the south and west by the Barisans, and with the narrow and quiet Strait of Malacca, beyond which again is the Malay Peninsula also with a high central range to the north and east, there is no monsoon in our area, and consequently neither a true rainy, nor a true dry season; though during the south-west monsoon there is a little more rain than usual, say about 18 days in the month, while during the north-east monsoon there are only 11 rainy days in the month. Nevertheless there is a yearly average rainfall of about 90 inches (2,200 mm.); this, together with a mean daily temperature of 80°, and an extreme daily range of 12·6° Fahrenheit, makes a very damp and unhealthy climate, but fits it for a high development of insect life. The plains of the three sultanates, the outer ranges of the Battak mountains, and the Battak mountains themselves, which include the Karo Central Plateau, are the localities where all the species of *Rhopalocera* contained in our collections and enumerated in the following list, have been captured, except a few from the Gayoe lands and from Indragiri, another Malayan sultanate south of Siak, and nearly opposite to Singapore.

The plains were formerly entirely covered with large, dense, lofty primeval forest, but this has had to make way for the miserable tobacco plant, of which the cultivation began about the year 1865. The primeval forest once destroyed by fire and the axe does not grow again, but is replaced by a high-growing and tenacious species of grass, called "Lalang" in Malay (*Imperata arundinacea*, Cyrill.), which now entirely covers all the ground temporarily unoccupied by tobacco. The cultivation of the nicotinous plant pays so highly and yearly so increases in extent, that there is now no forest whatever left in the

true tobacco districts of Deli — Deli being the name generally used as a topographical unity for all the three tobacco-yielding sultanates — and in consequence, as *Imperata arundinacea* is not liked by any animal, there have disappeared not only all the interesting pachyderms, but also all the butterflies whose food-plants are in the forests. Ten or twelve years ago, or even six or eight, certain species, for instance the different black and brown *Euplœas*, were to be found commonly everywhere. But then all the forest had not been cut down; now these species are never seen, having retired to the well-wooded outer hills and mountains, or to the boundaries of the tobacco districts north of Langkat, and to the south in Serdang. Only the most common species which feed on the *Gramineæ*, garden vegetables, cocoa-nut palms and other fruit-trees and on ubiquitous plants remain. So it has become necessary to send our collectors far away out of range of tobacco cultivation.

Regarding the elevations of the different places where our captures were made, we could generally distinguish four well-separated zones :—

1. The zone of the plains from the sea-board to the elevation of Namoe Oekor (266 feet), with the subzone of the beach, situated quite close to the mangrove fence of the coast. Laboean and the Saentis Estate are localities in this subzone, whereas Mabar (25 feet), Paya Bakong (40 feet), Stabat (45 feet), Medan, the capital of the Deli district (50 feet), Selesseh (90 feet), and Dr. Martin's later station at Bindjei (100 feet), all belong to this first zone.

2. The zone of the outer hills, beginning some few miles south of Namoe Oekor and extending to Bekantschan, the elevation of this district being between 300 and 2,400 feet. Kampong (village) Singhapura (725 feet), Namoe Tampis and Namoe Blanka (1,050 feet), are good localities in this zone, to which may also be added the villages of Bohorok and Kepras, situated more to the west in the direction of the Gayoe country.

3. The zone of the higher mountains which begins south of Bekantschan, and ends on the margin of the Central Plateau, with the frequently-visited valley of the Soengei Batoe (4,125 feet). Between Bekantschan and Soengei Batoe there is the Bekantschan pass, leading to the Central Plateau, at an elevation of 4,785 feet.

4. The Central Plateau itself, with no elevation less than 4,000 feet. The Kampongs of Naman, Beras Tepoe, Soekanaloe, and Atjih Djahé more to the south in the direction of lake Toba, were the spots where our collectors were most successful.

Two other good collecting places have to be mentioned. The first is Paya Bakong which is situated quite in the centre of tobacco-land.

Owing to the fortunate presence of an undrainable swamp on either side of the little Diski river, it still possesses a patch of high forest of several square miles in extent, in which many of the rarer species such as *Charaxes*, *Papilio hermocrates*, Felder, and *P. delessertii*, Guérin, have found an asylum. The second, the often-mentioned Selesseh, lies at a distance of six miles from Bindjei, and is on the border of tobacco cultivation and immediately to the west of the village of Selesseh, where there is splendid continuous primeval forest which yields precious crops of rare butterflies, especially on the banks of the large Wampoe river.

Our collectors were usually Battaks from the two mountainous zones; to Selesseh, however, and other places in the plains we usually sent two very clever Chinamen. The latter were most zealous if given some advance of pay, which allowed them to buy some necessary provisions and the never-to-be-omitted opium. On their return with their bag of captured butterflies they received the balance of their monthly salary, together with an extra bonus for any rarer spoil they may have been fortunate enough to capture. The Battaks received some rice and salt fish, enough to feed them for a fortnight, before leaving for the mountains, but as they are inveterate gamblers, and will not turn out of their villages till they had lost at some game of hazard or another every cent they possess, no advance in cash was given them. When all their money from the fruits of their last expedition was lost, then they asked for a tin box, some butterfly papers and a net, and moved off with their provisions very slowly and reluctantly southwards to the evergreen mountains. Being moreover very lazy, it was impossible to grant them a fixed salary, so they were paid solely by results, and by valuation of the captures they brought in. On their return from the mountains after delivering the insects and receiving their dollars, they immediately set to gambling, and did not appear again on the surface so long as a cent remained. All Battak collectors, even the most intelligent and zealous, lose their interest in the subject after a certain time, and would return with hardly anything, or a few common and useless species, and in consequence had to be discharged—a very great inconvenience, as it always takes a long time to break in a native as a good collector. Of course there was always lost or damaged many a rare and fine specimen through the awkwardness of a new collector. A few Gayoe collectors also were employed, who went farther away to the north and west to the Gayoe-lands. They brought various species of *Charaxes* largely, *Prioneris clemathe*, Doubleday, *Ixias ludekingii*, Vollenhoven, *Hebomoia borneënsis*, Wallace, *Papilio perses*, de Nicéville, and *P. payeni*, Boisduval, all of which are very rare or do not occur at all on the Central Plateau. In

1893 and 1894, Mr. de Nicéville induced three amateur collectors in British India to send down to Sumatra some of the well-known Lepcha collectors from Darjiling to Dr. Martin's care. These men met with very good success, though at first they were afraid to mix with the cannibal Battaks and refused to go to the mountains. However, after giving them a Battak guide and interpreter they went off to the hills regularly, and did very well there.

A large proportion of the really rare endemic species of butterflies found in the island occur only in the mountains, from the lower slopes of which and from the high Central Plateau, alone, are obtained the interesting species that are common to the eastern Himalayas and Sumatra, clearly showing the aforetime continuation of the Asiatic continent by way of the Malay Peninsula through Sumatra to Java and Bali, between which latter small island and the equally small island of Lombok occurs the deep depression in the sea floor which forms "Wallace's Line," dividing the Indo-Malayan from the Austro-Malayan region. The most remarkable of these species which are common to the Sikhim Himalayas and the mountains of Sumatra, but which have not as yet been recorded from the intervening Malay Peninsula are—

Enispe euthymius, Doubleday.

Pareba vesta, Fabricius, local race *vestita*, de Nicéville.

Apatura namouna, Doubleday.

Neptis sankara, Kollar.

Argynnis niphe, Linnæus.

Limenitis danava, Moore, local race *albomarginata*, Weymer.

„ *dudu*, Westwood, local race *bockii*, Moore.

Cyrestis (Chersonesia) risa, Doubleday and Hewitson, local race *cyanee*, de Nicéville.

Castalius ananda, de Nicéville.

Arrhopala teesta, de Nicéville.

Ilerda epicles, Godart, local race *ila*, de Nicéville.

Rapala schistacea, Moore.

„ *scintilla*, de Nicéville.

Delias belladonna, Fabricius.

Terias libythea, Fabricius.

Huphina nadina, Lucas.

„ *nerissa*, Fabricius, local race *sumatrana*, Hagen.

Papilio cloanthus, Westwood, local race *sumatrana*, Hagen.

„ *payeni*, Boisduval.

Cupitha purreea, Moore.

Halpe zema, Hewitson.

As mentioned above, north-eastern Sumatra does not possess a well-marked dry- and wet-season, such as is found over most of the continent of India, there being no month in the year when it does not rain; indeed it is rare for a week to pass without a shower, consequently there are no dry-season forms of butterflies to be found in Sumatra except the dry-season form of *Melanitis ismene*, Cramer (= *leda*, Linnæus, *anctorum*), which, as also in Java, is found all the year round equally commonly with the wet-season ocellated form, *M. determinata*, Butler.

We would especially bring to notice the occurrence in North-Eastern Sumatra of a very peculiar endemic form of the female of *Papilio memnon*, Linnæus. It belongs to the first form group of females of the species, *i.e.*, the form which has no tail to the hindwing and is most like the male; the second form is also tailless, but has a large white patch on the outer half of the hindwing never found in the first form. This peculiar first form female has the "epaulettes" (*i.e.*, the basal portion of the discoidal cell of the forewing on both surfaces) almost pure white, faintly tinged only with ochreous, so that it may perhaps be called cream-coloured. It probably mimics the second form female of *Papilio forbesi*, Grose Smith, which also possesses similar white epaulettes, the first form lacking them altogether, and is therefore like the male. It may be urged against this theory that females of *P. forbesi* are very rare, especially the white-epauletted second form, Dr. Martin having obtained only two specimens of it. But this scarcity is probably more apparent than real, both sexes of *P. forbesi* occurring in equal numbers, but the males coming down to the hill streams to drink are caught in large numbers, while their less thirsty spouses keep only to the thick forest where they escape the dangers of the butterfly net.

It should be pointed out that de Nicéville is solely responsible for the nomenclature employed in this paper, and for all statements appearing in the first person singular, together with the descriptions of species and sexes; while Martin, who has lived for 13 years in north-east Sumatra, is mainly responsible for the notes on distribution in the island itself, scarcity or rarity, season of occurrence, &c., of the various species; de Nicéville having but twice visited Sumatra, and then only for short periods.

The literature of the subject is of course very scattered and fragmentary. The following is a list of the principal papers dealing with the *Rhopalocera* of Sumatra:—

I. P. C. T. Snellen. *Tijd. voor Ent.*, vol. xx, p. 65 (1877), "*Lepidoptera op Sumatra verzameld, voornamelijk in Atchin*." Enumerates 35 species.

II. Henley Grose Smith. Appendix v of "The Head-Hunters of Borneo" by Carl Bock. English edition, 1881. "List of Sumatra Butterflies." Enumerates 226 species.

III. P. C. T. Snellen, *Tijd. voor Ent.*, vol. xxxiii, p. 215 (1890), "Lijst van *Lepidoptera* op Sumatra." Enumerates 48 species.

IV. Dr. B. Hagen. "Die Pflanzen- und Thierwelt von Deli auf der Ostküste Sumatra's." Separat-Abdruck aus "*Tijdschrift van het Koninklijk Nederlandsch Aardrijkskundig Genootschap.*" Jaargang 1890. Leiden.—E. J. Brill. Enumerates 323 species.

V. P. C. T. Snellen. "Midden-Sumatra." *Lepidoptera* (1892). Enumerates 104 species.

VI. Dr. B. Hagen. *Iris*, vol. vii, p. 1 (1894). "Verzeichniss der von mir auf Sumatra gefangenen *Rhopaloceren.*" Enumerates 109 species in the subfamilies *Papilioninæ*, *Pierinæ* and *Danainæ* only.

VII. Hofrath Dr. L. Martin. "Einige neue Tagschmetterlinge von Nordost-Sumatra." Munich, 1895. Pts. I and II. Enumerates 9 species.

Besides these papers exclusively on Sumatra butterflies search has been made for all references to the butterflies of the island in Mr. W. F. Kirby's "A Synonymic Catalogue of Diurnal *Lepidoptera*" up to 1877, and "The Record of the Zoological Literature" up to 1893, the date of the last volume published; Dr. A. R. Wallace's papers on Eastern Butterflies; Mr. A. G. Butler's paper on the Butterflies of Malacca; Dr. O. Staudinger's "Exotische Schmetterlinge," and the Butterflies of Palawan; Herr Georg Semper's "Schmetterlinge der Philippinischen Inseln;" and Mr. W. L. Distant's "*Rhopalocera Malayana.*" It is hoped that the list is fairly complete as far as present knowledge goes. The remarks on each species are headed by the names of the different writers who have recorded the species from Sumatra. All those species that have not been obtained by ourselves have an asterisk (*) prefixed to the name. Dr. Martin is of opinion that this list cannot be greatly extended, and that it is nearly complete. I do not agree with him; up to the last month of his stay in the island, species new to the list continued to be obtained; besides which, considering the vast extent of the island, that it is largely covered with almost impenetrable virgin forest, that a considerable portion of the country has never been explored, that it contains a continuous chain of high volcanic mountains running throughout its entire length which is almost unknown, and has been crossed from north to south in but few places, and finally that Dr. Martin's collectors visited a few favoured spots only, at most 50 miles apart, I think it almost certain that this list will some day be increased by an additional 100 species at least. At the

same time we may we think point with some little pride to the fact that it is far larger than any local list which has ever been published except for certain places in Central and South America, containing as it does some 756 species. Next to it probably in size is de Nicéville's "A List of the Butterflies of Sikhim" in the Gazetteer of Sikhim (1894), in which 631 species are enumerated. Synonymy for the commoner and better known species has not been given; but all references to figures of species from Sumatra and lately described species, as well as synonyms of recent date have as far as known been entered.

The imperfections of this list are doubtless many, but we would ask our adverse critics to remember the disadvantages of working in a tropical climate, and also the many letters that have to be written, the number of books to be consulted, the many collectors to be "caught," trained, supplied with necessaries and depatched to the collecting grounds, and the time occupied in preparing and conserving the specimens when obtained, before a list similar to this one can be presented to, let us hope, an indulgent public.

Family NYMPHALIDÆ.

Subfamily DANAINÆ.

1. HESTIA LYNCEUS, Drury.

H. reinwardti, Moore, Proc. Zool. Soc. Lond., 1883, p. 218, n. 3.

H. druyri, l. c., p. 219, n. 6.

Snellen as *linceus* [sic]. Hagen as *lynceus* and *lynzens* [sic]. Grose Smith. Butler. Staudinger. Distant. Moore as *reinwardti* and *druyri*. A common species, occurring from the lower slopes of the mountains to the sea. As usual it is very variable, two of these varieties have been described by Moore as distinct species occurring in Sumatra. The dark variety figured by Distant in Rhop. Malay., pl. i, fig. 2, only comes from places near the mountains and the outer slopes where the rainfall is far heavier than in the plains, while the lighter specimens are found in the forests of the alluvial plain, but the two forms gradually merge the one into the other, and no distinguishing line can be drawn between them. Specimens of the genus *Hestia* are nearly always seen in pairs, and are very fond of flying over the small streams so common in our forests. They never leave the high forest, probably because they have a very weak flight, and their enormous tissue-paper-like wings cannot withstand the wind away from the shelter of the trees.

2. HESTIA BELIA, Westwood.

Hagen as *linteata*. The Sumatran form of this species appears to

be nearer to the Javan *H. belia* than to the whiter *H. linteata*, Butler, from the Malay Peninsula, but at best the latter is but a local race of the former. For many years there existed a single specimen in Dr. Martin's collection without locality label, and he nearly despaired of getting it again, when in May, 1894, he obtained all at once in one spot five specimens from Bandar Quala in Serdang, where no specimen of *H. lynceus*, Drury, is ever found, as Mr. Puttfarcken, a very enthusiastic collector of that place, has noted.

3. IDEOPSIS (*Gamana*) DAOS, Boisduval.

Snellen as *Hestia daos*. Hagen as *I. daos*, Horsfield and Moore [sic]. Butler. Staudinger. Distant. Mr. W. F. Kirby, in "Allen's Naturalist's Library. Lepidoptera," vol. i, p. 15 (1894), suggests that the form of this species occurring in Sumatra may be distinct from the typical Bornean form. I possess specimens from both islands, and find that they agree almost exactly. Dr. Staudinger refers to a darker form of the species occurring in Sumatra and Nias. The former is normal; the latter is the *Gamana costalis* of Moore, and is a distinct species. In Sumatra *I. daos* is found not higher than Bekantschan. It is mimicked by a very beautiful day-flying Moth, probably of the genus *Isbarta*, Walker (? *I. glauca*, Walker, from Sumatra), family *Zygænidæ*. On "The Crag" at Penang, 2,000 feet, *I. daos* is very common.

4. DANAIS (*Radena*) VULGARIS, Butler.

Grose Smith. A common species of the plains, the female much rarer than the male. It occurs all the year round, but if there should be a break in the regular rainfall, as there is sometimes in February and March, then only worn specimens are on the wing, shewing that damp weather is necessary for the disclosure of imagines; otherwise generation follows generation regularly throughout the year.

5. *DANAIS (*Radena*) SIMILIS, Linnæus.

Grose Smith. Snellen. Hagen. Mr. Henley Grose Smith is the only writer who gives both *D. vulgaris*, Butler, and *D. similis* from Sumatra. Mr. Moore restricts *D. similis* to Hongkong and Formosa. I greatly doubt its occurrence in Sumatra.

6. *DANAIS (*Radena*) JUVENTA, Cramer.

Moore. Semper from West Sumatra. As it is found in Singapore (Moore), Banka, Java, Labuan, Lombok and Billiton, it is possible that it may also occur in Sumatra in the south and west. Banka and Java are only separated from Sumatra by very narrow straits.

7. DANAIS (*Tirumala*) SEPTENTRIONIS, Butler.

Hagen. Quite common in the plains and lower slopes of the hills.

8. *DANAIS (*Tirumala*) LIMNIACE, Cramer.

Hagen. As this species occurs in Burma and the Nicobar Isles, it is possible that it may also be found in Sumatra. However, as Dr. Hagen records in his first paper *D. limniace* and no *D. septentrionis*, and in his second paper *D. septentrionis* and no *D. limniace*, his first identification was probably incorrect.

I wish to take this opportunity to record the occurrence of a butterfly in Malayana which has been well-named in English "The Wanderer," but about whose specific name there has of late years been much contention and confusion. Formerly it was known as *Danaïs archippus*, Fabricius (1793), then as *Danaïs* (*Anosia*) *plexippus*, Linnæus (1758); recently, however, Mr. W. F. Kirby in "Allen's Naturalist's Library. Lepidoptera," vol. i, pp. 12 and 19 (1894), has pointed out that the *Papilio plexippus* of Linnæus, and the *Papilio archippus* of Cramer [sic, ? Fabricius] cannot apply to this species, and that it should be known as *Danaïs* (*Anosia*) *menippe*, Hübner, described in 1816. But an older name than this last is *Papilio erippus*, Cramer (1775), which should apparently be applied to it, unless *Danaïs erippus*, described from Brazil, be considered to be a distinct species from *D. menippe*, which, however, Mr. Scudder is not prepared to admit it to be, in which case *D. erippus* must be applied to "The Wanderer." It is certain, however, that *D. erippus* is not the typical form, being in fact a local race of *D. menippe*, so that our species must, as Kirby says, be known as *D. menippe*, Hübner. In my opinion the most accurate nomenclature for the butterfly would be *Danaïs* (*Anosia*) *erippus menippe*, Hübner. At any rate the species here treated has been well figured by Cramer in "Papillons Exotiques" on plate ccvi, figs. E, F (1779), from a female example as *Papilio plexippus*. Mr. W. F. Kirby has already recorded it from Java, I now, for the first time I believe, record it from North Borneo, the late Mr. W. Davison, who was for some years and till his death the Curator of the Raffles Museum, Singapore, having sent me to see a male specimen from that island. The Rev. W. J. Holland, Ph. D., in the Ann. Report Ent. Soc. Ontario for 1893, notes that he has received single specimens of *Danaïs plexippus*, Linnæus, from Borneo and Java, also its occurrence in the Azores. In Part ii of a new edition of Morris' "A History of British Butterflies," p. 72 (1895), it is stated (though the authority is not given) to have been found in the Andaman Islands. Furthermore, the late Mr. E. F. T. Atkinson in 1889 presented a female specimen of this

species to the Indian Museum, Calcutta, which was captured on the 19th April, 1889, by Mr. C. White, the chief officer on board the Peninsular and Oriental S. S. "Ravenna" in the Straits of Malacca (which is at the point where the butterfly was caught only a few miles broad), not far off the island of Pulo Jara between Penang and Singapore. It is therefore not at all improbable that the butterfly flew off from either the adjacent island of Sumatra or from the Asiatic mainland. I have for some years past been looking forward to its capture in India proper, and I think it cannot be long hence before we have evidence of its having established itself on this continent.

P.S.—Since the above was in type, I have lighted on an article in "The Entomologist's Record and Journal of Variation," vol. v, p. 1 (1894), by Dr. F. J. Buckell, entitled "Danaïs archippus, Anosia plexippus, or What," in which he discusses the question of the correct name by which "The Wanderer" should be known, and arrives at the following conclusions:—

"1.—The balance of argument is against the claim that the American insect is the *plexippus* of Linnæus.

2.—The earliest name given to that species was *erippus*, Cramer, and, if the 'law of priority' is to be pedantically adhered to, this is the trivial name that must be adopted.

3.—The Fabrician name, *archippus*, is that by which the species has been most widely known, and as changes in accustomed nomenclature are to be deprecated, and as, moreover, *erippus*, Cramer, is a varietal form found in Brazil, *archippus* should be retained as the trival name of the species, and *erippus* used as the name of the variety."

As will be seen above, I am unable to follow Dr. Buckell in his conclusions, priority of nomenclature *must* in all cases be strictly maintained.

9. DANAIS (*Limnas*) CHRYSIPPUS, Linnæus.

Snellen. Hagen. Moore. Found only in the alluvial plain, all the year round, but always very local, and restricted to spots where its food-plant, species of *Calotropis* and *Asclepias*, are found in abundance. There, under a concatenation of favourable circumstances, an immense increase of the species, and thousands of specimens, appear. When an overpopulation of this nature occurs, all the food-plants are entirely eaten up by the caterpillars, food gets scarce, and the few butterflies which reach maturity are very small. It takes a long time to recover, and not a single specimen may be seen for a year.

Aberration *alcippus*, Cramer (= *alcippoides*, Moore). Hagen as var. *alcippoides*. Semper as *alcippus* from a small island near Sumatra

(Tijd. voor Ent., vol. xxiii, pp. xiii and xiv (1880). Alphéraky has figured this aberration in Romanoff's "Mémoires sur les Lépidoptères," vol. v, p. 220, pl. xi, fig. 3, *female* (1889), from Teneriffe. Mr. Moore records this "species" from Singapore; it is almost as common as *D. chrysippus* in the plains of Sumatra. I am unable to consider *D. alcippoides*, Moore, Proc. Zool. Soc. Lond., 1883, p. 238, n. 3, pl. xxxi, fig. 1, *male*, as an aberration even to be distinct from the *D. alcippus* of Cramer. It is true that the oblique subapical series of spots on the forewing, especially on the underside, appears to be somewhat broader in Oriental than in African specimens (I have, however, only Cramer's figure of the African form of *D. alcippus* to guide me), but all the other characters given by Mr. Moore to distinguish between the two forms are so obviously variable even in Sumatran specimens that they can have no specific value. I hold that *D. alcippus* is an occasional aberration or "sport" only of *D. chrysippus*, certainly not a distinct species. Dr. Martin during the first years of his residence in Sumatra from 1882 to 1891, as also Dr. Hagen, never saw *D. alcippus*, the first specimens appearing in 1892 near Selesseh, immigrating into Deli from the north-west. Since that year the true *D. chrysippus* has become rarer and rarer, and the aberrational form has become more and more common.

10. *DANAIS (Salatura) INTERMEDIA*, Moore.

Salatura sumatrana, Moore, Proc. Zool. Soc. Lond., 1883, p. 242, n. 8.

Moore as *sumatrana*. Hagen as *genutia*. Very common in the plains of Sumatra. It is, I think, a very remarkable fact that *D. plexippus*, Linnæus,* which is a common species in the Malay Peninsula, should not be found in Sumatra, but be replaced by *D. intermedia*, which latter in the Malay Peninsula is probably only an aberration or "sport" of *D. plexippus*, but has become fixed as a distinct species in Sumatra. In my collection from the Asiatic mainland I have every gradation between typical *D. plexippus* and *D. intermedia*. I am quite unable to find any character by which to separate *D. sumatrana*, Moore, from *D. intermedia*, Moore.

* Mr. W. F. Kirby has recently shewn in "Allen's Naturalist's Library. Lepidoptera," vol. i, p. 19, pl. v, fig. 1, *male* (1894), that the butterfly which has for the last fifteen years or so gone under the name of *Danaïs genutia*, Cramer (1779), must revert to the name by which it was previously almost universally known, viz., *Danaïs plexippus*, Linnæus (1758), which latter was described as having a white band on the forewing like *D. chrysippus*, Linnæus, a character not found in any American species of *Danaïs*, *D. plexippus* having been originally erroneously described from America.

11. *DANAIS* (*Salatura*) *HEGESIPPUS*, Cramer.

Snellen as *hegesippus* and as *melanippus*, the latter being a distinct local race from Java. Hagen as *melanippus*, var. *hegesippus*. Butler as *melanippus*. Distant as *melanippus*, var. *hegesippus*. It was figured by Cramer from a female specimen from the west coast of Sumatra. *D. intermedia*, Moore, is found in the smaller hills bordering the alluvial plain, and is still to be got at Bekantschan, whereas *D. hegesippus* is always found within a moderate distance of the sea. On the islands of Penang, Singapore and Rian (the latter belonging to the Dutch) *D. hegesippus* occurs commonly, while *D. intermedia* is decidedly rarer, or wanting altogether.

12. *DANAIS* (*Bahora*) *ASPASIA*, Fabricius.

Hagen as *crocea*; also as *aspasia*, var. *crocea*. Standinger. Distant as *aspasia*, var. *crocea*. I am quite unable to separate *D. crocea*, Butler, from *D. aspasia*, vide Journ. Bomb. Nat. Hist. Soc., vol. x, p. 13, (1895). I have a large series of these two supposed distinct species from the typical localities for each, and they are absolutely indistinguishable. *D. aspasia* may be found in Sumatra all the year round, but always only singly. In the spots where a blue Heliotrope-like flower is in abundance, the males of this species will occur singly together with numerous species of *Danais* and *Euplaea*, but the females are only found in the forests, and never frequent these well-beloved flowers of their husbands, brothers and cousins.

13. *DANAIS* (*Parantica*) *AGLAIODES*, Felder.

Hagen as *agleoides* [sic]. Grose Smith as *agleoides* [sic]. Standinger as *agleoides* [sic]. Distant as *agleoides* [sic]. The males are very common in the plains, the females very rare as in the case of *D. vulgaris*, Butler. On the wing these two species are hardly distinguishable.

14. **DANAIS* (*Parantica*) *GRAMMICA*, Boisduval.

Grose Smith. Dr. Martin has never met with this species. Mr. Moore restricts it to Java, but it may quite possibly occur at the south-east end of Sumatra, which is only separated from Java by the very narrow Sunda Strait. It is known to me by Boisduval's figure only.

15. *DANAIS* (*Caduga*) *TYTIOIDES*, de Nicéville.

D. melaneus, Cramer, var. *tytoides* [sic], Hagen, Die Pflanzen- und Thierwelt von Deli auf der ostküste Sumatra's, p. 192, n. 5 (1890).

D. (Caduga) tytoides, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. viii, p. 37, n. 1, pl. K, figs. 1, male; 2, female (1893).

Hagen. Occurs somewhat rarely only on the Central Plateau and

not below 3,000 feet elevation, not even being found at Bekantschan. As Dr. Hagen wrongly diagnosed this species by making it a "variety" of *D. melaneus*, Cramer, which it certainly is not, seeing that it is a local race of *D. tytia*, Gray; as moreover, he spelt the name incorrectly, I refuse to accept his name for the species, though it is prior to mine. In all cases where a species has been first described incorrectly as a "variety" of another species, and is subsequently proved to be a distinct species, it is optional for the author who so proves it to be distinct to use the varietal name so given to it in a full specific sense, or to rename it altogether.

16. DANAIS (*Caduga*) BANKSII, Moore.

Caduga banksii, Moore, Proc. Zool. Soc. Lond., 1883, p. 251, n. 8.

Moore. Grose Smith as *melaneus*, Cramer. Semper as *aglea*, Cramer. Hagen as *aglea* and *melaneus*. It is a good local race of *D. melaneus*, Cramer, from the eastern Himalayas, Assam, Burma, and the Malay Peninsula. Occurs on the Central Plateau and higher hills as also in the plains, the specimens from the highest points being richer and darker in colour than those from a lower elevation.

17. * EUPLŒA (*Menama*) BUXTONI, Moore.

Menama buxtoni, Moore, Proc. Zool. Soc. Lond., 1883, p. 265, n. 5.

Moore. Originally described from Sumatra. Dr. Martin has not met with any species of this distinct subgenus in Sumatra.

18. * EUPLŒA (*Menama*) MODESTA, Butler.

Grose Smith. Originally described from Siam. It is more than doubtful if two species of the subgenus *Menama* occur in Sumatra. Dr. Hagen records quite funnily "*Menama* species near *loeza*." He does not appear to know that *Menama* is a genus of Mr. Moore's, he treats the name as specific. The species "*loeza*" is probably intended to mean *Menama lorzæ*, Moore, Proc. Zool. Soc. Lond., 1883, p. 265, n. 6, pl. xxxi, fig. 5, male, from Sandakan, North Borneo.

19. EUPLŒA (*Tronga*) BREMERI, Felder.

Hagen. Butler. A common species in the plains and occurs also in the lower ranges of the mountains up to 1,500 feet elevation. In December, 1894, and January, 1895, Dr. Martin obtained hundreds of specimens from Kepras, a village on the boundary between Langkat and the independent Battak country. The female is always somewhat scarce. It may be of interest to note that out of large numbers of butterflies of this species there are always to be found a few males which

have on the upperside of the forewing a short and sometimes even a quite distinct and longer "male-mark." The genus *Tronga* comes into Mr. Moore's group A of the *Euplœina*, which is defined as having "No 'sexual-mark' or scent-producing organ on forewing." But there are many exceptions to this definition.

20. EUPLÆA (*Tronga*) MOOREI, Butler.

Butler. Kirby. Moore. This species may be distinguished from *E. bremeri*, Felder, by its smaller size, the duller colour of the upperside of both wings, being brown, not black, with all the white spots smaller. It never shews any traces of a "male-mark." It occurs in the plains about equally commonly as *E. bremeri*, though it is found also at somewhat greater elevations in the hills, occurring even on the Central Plateau; these latter specimens show only very few white spots.

21. *EUPLÆA (*Tronga*) HEYLÆRTSII, Moore.

Tronga heylærtsii, Moore, Lep. Ind., vol. i, p. 79 (1890).

Moore. Described from Sumatra, but we have failed to recognise it.

22. EUPLÆA (*Adigama*) MALAYICA, Butler.

Euplœa ochsenheimeri, Lucas, Snellen, Midden-Sumatra, Lepidoptera, p. 12, n. 1, pl. ii, figs. 1, 2, male (1892).

Grose Smith as *ochsenheimeieri* [sic]. Moore. Snellen as *ochsenheimeri*, Lucas. Hagen as *ochsenheimeri*, Butler and Lucas. Staudinger. Distant. This beautiful and large species is found only in the deep forests of the plains, never higher than Namoe Oekor. It flies mostly alone high over the small openings in the evergreen forests, and is found all the year round, but never in large numbers. There has been much confusion regarding the name *Euplœa ochsenheimeri*. Two species have been so called, one by Lucas in 1853, and one by Moore in 1857, both from Java. Mr. Moore places his own species in the genus *Adigama*, and Lucas' in *Tiruna*. There has been no *Euplœa* named *ochsenheimeri* by Butler, as stated by Dr. Hagen. To further complicate matters, Snellen figures *E. malayica*, Butler, as *E. ochsenheimeri*, Lucas, with which it has nothing whatever in common.

23. *EUPLÆA (*Andasena*) BELINDA, Butler.

Euplœa belinda, Butler, Journ. Linn. Soc. Lond., Zoology, vol. xiv, p. 299, n. 2 (1878).

Butler. Moore. Originally described from Sumatra. We have seen no *Euplœa* from Sumatra belonging to the subgenus *Andasena*.

24. **EUPLOEA* (*Andasena*) *OROE*, Boisduval.

Kirby. Butler as a var. with a query, from Sumatra. Originally described from Taïti, recorded from Timor by Butler. Very doubtfully Sumatran.

25. **EUPLOEA* (*Betanga*) *SCHERZERI*, Felder.

Kirby. Originally described from Ceylon. Entirely unknown to us.

26. *EUPLOEA* (*Penoa*) *MENETRIESII*, Felder.

Grose Smith. Hagen. Distant. Not very common. Found in the plains and also on the outer hills as high as Bekantschan. The female is much rarer than the male, and often shews a white spot in the discoidal cell of the forewing on the upperside. It has in the male a much smaller "male-mark" than *E. pinwillii*, Butler.

27. *EUPLOEA* (*Penoa*) *PINWILLII*, Butler.

Hagen as *pinwilli*, Godardt [sic]. Staudinger. Is very common everywhere at low elevations, and especially frequents the above-mentioned Heliotrope-like flowers. The female is of course much rarer than the male, and possesses a violet gloss to both wings on the upperside, which the female of *E. ménétriesii*, Felder, never has. It has in the male a much larger "male-mark" than in *E. ménétriesii*.

28. **EUPLOEA* (*Crastia*) *CORE*, Cramer.

A single female recorded from Sumatra by Snellen, the specimen being probably some species of *Tronga*. *E. core* is practically confined to the continent of India.

29. *EUPLOEA* (*Crastia*) *DISTANTII*, Moore.

Crastia distantii, Moore, Ann. and Mag. of Nat. Hist., fifth series, vol. ix, p. 453 (1882).

Euploea distantii, Distant, Rhop. Malay., p. 32, n. 13, pl. v, fig. 9, *male* (1882).

Crastia distantii, Moore, Proc. Zool. Soc. Lond., 1883, p. 278, n. 5, pl. xxix, fig. 6, *male*.

Moore. Hagen as *distantii* [sic]. Distant as *distantii* [sic]. Originally described from Sumatra. Never found at the higher elevations in the hills, and is more plentiful near the sea; especially so in both sexes on both sides of the Wampoe River near the village of Stabat. It is the commonest of the brown *Euploea*s in our area. Both sexes exhibit very many variations in the shade of the brown colour of both wings. The male has sometimes absolutely no "male-mark" as should be exhibited according to Mr. Moore's definition of his group A; there is sometimes

a small one on the upperside of the forewing in the submedian interspace; sometimes there is a large narrow mark; sometimes a large broad mark as in Mr. Moore's group B. In some hundreds of specimens which I have examined I have found every intergrade between these four forms, which goes to prove that in some groups of *Euplœas* the "male-marks" cannot be used in even a subgeneric sense. Dr. Hagen as late as 1889 noted that *E. distantii* is everywhere very common around the feet of the traveller. It may here be mentioned that all the brown *Euplœas*:—*bremeri*, *moorei*, *distantii* and *ægyptus* (which follows) were all more or less plentiful in Deli so long as there were forests. But owing to the cultivation of tobacco all the forests have been cut down, the brown *Euplœas* have become rarer and rarer in the true tobacco districts, but may still be found as plentifully as in former years only on the boundaries of Deli, Langkat and Serdang, where again the forests commence. Even *E. distantii* is now decidedly rare in Deli and Langkat proper.

30. **EUPLÆA* (*Crastia*) *INCONSPICUA*, Moore.

Crastia inconspicua, Moore, Proc. Zool. Soc. Lond., 1883, p. 279, n. 10.

Moore. Originally described from Sumatra. Unknown to us.

31. **EUPLÆA* (*Crastia*) *AMYMONE*, Godart.

Danaïs amymone, Godart, Enc. Méth., vol. ix, p. 179, n. 11 (1819).

Crastia amymone, Moore, Proc. Zool. Soc. Lond., 1883, p. 279, n. 13.

Butler. Moore. Described by Godart from Amboina, recorded from China and Cochin China by Moore. Unknown to us.

32. **EUPLÆA* (*Crastia*) *FELDERI*, Butler.

Euplœa felderi, Butler, Proc. Zool. Soc. Lond., 1866, p. 275, n. 20.

Butler. The type (a female) was from Sumatra. Recorded from Hong Kong by Moore. Unknown to us.

33. *EUPLÆA* (*Trepsichrois*) *LINNÆI*, Moore.

Trepsichrois van-deventeri, Forbes, A Naturalist's Wanderings, p. 274 (1885).

Forbes as *van-deventeri*. Grose Smith as *midamus*. Snellen as *midamus*. Hagen as *midamus*. Hagen also gives "var. *mulciber*, Distant [sic]. Butler as *midamus*. Staudinger as *midamus*. Distant as *midamus*. Moore. The commonest species of *Euplœa* both in the plains and hills in Sumatra. It is found all the year round and always in fresh generations. Of all the species of *Euplœa* it is the most mimicked, in the female by the female of *Elymnias laisidis*, de Nicéville; in the male by the third form of the female of *Euripus halitherses*, Doubleday and Hewitson; in the male by the first form of the female of *Hypolimnas anomala*,

Wallace; also *Papilio butleri*, Janson, in both sexes mimicks both sexes of this *Euplœa*. The scent of *Euplœa linnæi* reminds Dr. Martin of "Worcester Sauce." The males are variable; in one variety the spots on the upperside of the forewing are violet, in another they are white. These latter specimens would appear to agree with *E. mulciber*, Cramer, described by him from China and the Coromandel Coast (the latter locality is certainly erroneous), but restricted by Moore to the islands of Borneo and Billiton. My male specimens of *Trepsichrois* from Borneo do not at all agree with Cramer's figure of "*Papilio*" *mulciber*, having the spots on the upperside of the forewing very small (much smaller than in typical *E. linnæi*) and violet, instead of large and white as portrayed by Cramer.

34. EUPLŒA CASTELNAUI, Felder.

Hagen. Never occurs in Deli, Langkat and Serdang, all the specimens from Sumatra—about a dozen—in Dr. Martin's collection were caught by his brother, Dr. Friedl Martin, in Asahan, south of our area; still further south of Asahan, at Indragiri, where Dr. F. Martin also collected, he failed to get *E. castelnaui*. At Penang it occurs close to the sea-shore, but it flies high and is not easily caught. It is always solitary, several specimens are never seen together.

35. EUPLŒA (*Calliplœa*) EUNUS, de Nicéville, n. sp.

Grose Smith as *ledereri* and *mazares*. Hagen as *ledereri*. Moore as *ledereri*. Staudinger as *mazares*.

HABITAT: N.-E. Sumatra.

EXPANSE: ♂, 2·5 to 2·9; ♀, 2·7 to 3·0 inches.

DESCRIPTION: MALE and FEMALE. Allied to *E. (Calliplœa) mazares*, Moore, from Java, but differing therefrom in having the UPPERSIDE of both wings almost entirely unglossed with purple, while that species has the anterior two-thirds of the forewing and a small patch in the middle of the hindwing purple-glossed; the white, violet-glossed spots on both wings the same.

E. eunus, de Nicéville, from Sumatra, *E. mazares*, Moore, from Java, *E. ledereri*, Felder, from the Malay Peninsula, and *E. aristotelis*, Moore, from Borneo, can be arranged in a regular series by the extent of the purple-glossing of both wings on the upperside, *E. eunus* being the least, *E. aristotelis* the most purple-glossed; the latter, indeed, if I have correctly identified it, having the whole of the forewing and a considerable area on the hindwing very rich iridescent purple.

This species is never found at high elevations, not even as high as Bindjei, but always close to the sea. It is very plentiful on

the river banks of the Wampoe near Kampong Inei and Stabat, and is found in company with *Danais hegesippus*, Cramer, and *Euplœa distantii*, Moore, the *Danainæ* of the lowest elevations. For twelve years Dr. Martin did not succeed in obtaining a female, only in the last two years were females found in considerable numbers by the imported Lepcha collectors from India, but that sex is always much rarer than the male.

36. *EUPLŒA* (*Danisepa*) *DIOCLETIANUS*, Fabricius.

Grose Smith as *rhadamanthus*. Snellen as *radamanthus* [sic], and *rhadamanthus*. Hagen as *diocletianus* [sic], and *rhadamanthus*, Horsfield [sic]. Staudinger as *rhadamanthus*. Distant. Moore. Mr. Moore has recently shewn that Fabricius described "*Papilio*" *diocletianus* from a female, and "*Papilio*" *rhadamanthus* from a male of the same species, so the earlier name applied to the species is here used irrespective of the sex. Is rather a common species in the plains, and occurs in the outer hills as high as Bekantschan; the female is always much rarer than the male. The male is mimicked by *Papilio velutinus*, Butler, and also by the first and second forms of *Euripus halitherses*, Doubleday and Hewitson.

37. **EUPLŒA* (*Selinda*) *ELEUSINA*, Cramer.

Snellen records a single male from Sumatra. But for this solitary identification the species has always been considered to be confined to Java.

38. *EUPLŒA* (*Salpinx*) *LEUCOSTICTOS*, Gmelin.

Grose Smith as *novaræ*. Hagen as *novaræ*. Butler as *vestigata*. Distant as *vestigata*. Very rare in Sumatra, perhaps commoner in Java than elsewhere. I have during many years past added to my collection every specimen of this group of *Euplœa* I could obtain, and now that I have very extensive material to compare, I find that it is quite impossible to separate *E. leucostictos*, described in 1789, *E. dehaani*, Lucas (1853), *E. novaræ*, Felder (1862), *E. vestigiata*, Butler (1866), *E. leucogonys*, Butler (1879), and *E. lazulina*, Moore (1883). The species is obviously a variable one, the variations which it exhibits are not confined to particular localities, but are shewn wherever it is found. Mr. Moore in Proc. Zool. Soc. Lond., 1883, restricts *E. novaræ* to the Nicobar Isles and Tenasserim, *E. vestigiata* to Sumatra, *E. lazulina* to Malacca, *E. leucogonys* to Malacca, *E. leucostictos* to Java, and *E. dehaani* to Java. All *Euplœas* in Sumatra, both the brown and blue ones, even the rare *E. leucostictos*, are exceedingly fond of spots where there is shade from

the direct sunlight, especially where there is dead wood, so that they may frequently be found in the open verandahs of houses near the forest, or on wooden bridges over rivers, which in Sumatra are almost always furnished with an attap roof made of palm leaves to protect the woodwork from the rain. To these places do the *Euplæas* resort, for a short time emerging into the sunlight and exhibiting their lovely iridescent colours, then returning to the favourite spot on wood, where they rest with folded wings; this evidently much-enjoyed sport of the butterflies continuing the whole day till three or four o'clock in the afternoon, when the lengthening shadows warn them that it is time to retire to their resting places in the adjoining forest, where they spend the night. It was on one of these wooden bridges that Dr. Martin obtained his first *E. leucostictos*.

39. *EUPLÆA (*Isamia*) CHLOE, Guérin.

Distant. Butler.

40. *EUPLÆA (*Isamia*) DEJEANI, Distant.

Distant. Moore. Mr. Distant expresses the opinion that this species "May be but an extreme variety of *E. chloë*," Guérin, which latter by Mr. Moore is restricted to Province Wellesley in the Malay Peninsula. I am also of this opinion, but keep it distinct for the present, as I have seen no specimen agreeing exactly with Mr. Distant's figure and description of *E. dejeani*.

41. *EUPLÆA (*Isamia*) SOPHIA, Moore.

Originally described from Sumatra by Moore.

42. EUPLÆA (*Isamia*) ÆGYPTUS, Butler.

E. ægyptus, Snellen, Midden-Sumatra, Lepidoptera, p. 12, n. 2, pl. i, figs. 1-3, male (1892).

Grose Smith. Snellen. Hagen. Kirby. Moore. A rather rare species in the plains, and found on the lower slopes of the hills as high as Bekantschan. The female is excessively rare. I have retained this name for the species of *Isamia* (I have been able to recognise only one) occurring in Sumatra, as so many authors have identified the Sumatran form of *E. chloë*, Guérin (which is the oldest name for the species of this group) under it. But I am very strongly of opinion that instead of four species of *Isamia* as recorded above occurring in Sumatra there is only one, and moreover, that several other species kept separate by Mr. Moore should be added to the synonymy.

43. *EUPLEA (*Narmada*) CONSIMILIS, Felder.

Moore. Originally described from Java. Unknown to us from Sumatra.

44. EUPLEA (*Narmada*) MARTINII, de Nicéville.

E. (Narmada) martinii, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. viii, p. 38, n. 2, pl. K, figs. 3, male; 4, female (1893).

Not uncommon in the higher mountains and on the Central Plateau, but never below 3,000 feet elevation. In this species both sexes were almost always brought in equal numbers. It is almost unrivalled in the male in the rich velvety deep black coloration of its upperside.

45. EUPLEA (*Stictoplaea*) HARRISII, Felder.

Grose Smith as *tyrianthina*. Hagen as *thyriantina* [sic]. Moore as *tyrianthina*. As I can exactly match Sumatran specimens of *E. tyrianthina*, Moore, with Khasi Hill examples of *E. harrisii*, Felder, I record the species under the latter name, as it is much the older. *E. harrisii* is richly blue-glossed, in spite of Mr. Moore having stated the contrary in *Lepidoptera Indica*, vol. i, p. 138 (1891). In Sumatra it is, as this species goes, fairly constant, though the spots on both wings as usual shew considerable variation both as to size and number. I possess some which coincide precisely, spot for spot, and in the extent of the blue coloration, with Mr. Moore's figure of *Stictoplaea crowleyi* (l.c., pl. lii, fig. 2, male). For notes on the variability and synonymy of *E. harrisii*, see de Nicéville, Proceedings Asiatic Society Bengal, 1892, n. 158. In Sumatra it is found in the alluvial plain and also as high as Bekantschan and Kepras in the hills. The female is as usual very rare. Dr. Martin caught his first male specimen under the roof of a wooden bridge over the Bindjei river near Namoe Oekor.

46. *EUPLEA (*Stictoplaea*) PICINA, Butler.

E. picina, Butler, Proc. Zool. Soc. Lond., 1866, p. 280, n. 36, pl. xxx, fig. 1, male.

Butler. Moore. Originally described from Sumatra. Unknown to us.

47. *EUPLEA (*Stictoplaea*) INCONSPICUA, Butler.

Butler. Moore. Originally described from Sumatra. Unknown to us.

Subfamily SATYRINÆ.

48. MYCALESIS (*Satoa*) MAIA, de Nicéville.

M. (Satoa) maia, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 1, n. 1, pl. i, figs. 1, male; 2, female (1894).

Grose Smith as *maianeas*. Snellen as *majaneas* [sic]. Hagen as *maianeas*. Occurs only in the large forest, and never at low elevations, its region commencing at Namoe Oekor and thence into the hills. It is always found on or very near to the ground. Very easily damaged, hardly ever is a perfect specimen obtained.

49. *MYCALESIS (*Dalapa*) SUDRA, Felder.

Moore. Not rare in Java, unknown to us from Sumatra.

50. MYCALESIS (*Suralaya*) ORSEIS, Hewitson.

Grose Smith. Hagen. Snellen. Kirby. Distant. Also a true butterfly of the high forest, and is the only Sumatran *Mycalesis* which has a bluish gloss on the upperside of the wings as so many forest butterflies have in a greater or less degree, such as the *Cœlites*, *Thaumantis*, *Amathuixidia dilucida*, Honrath, and others; even the *Lampides* of the forest, *L. saturata*, Snellen, *L. elpis*, Godart, and *L. subdita*, Moore, are far richer and deeper blue than the *Lampides celeno*, Cramer, of the roads.

51. MYCALESIS (*Orsotriæna*) MEDUS, Fabricius.

Hewitson as *hesione*. Snellen as *hesione*. Grose Smith as *hesione*. Hagen. Distant. Very common in the plains. The dry-season form of the species found in many parts of India, *M. runeka*, Moore, is quite unknown in Sumatra. Dr. Martin has bred it in Sumatra on grass, from eggs laid by females shut up in glass prune bottles. He considers that *Orsotriæna* should be used in its full generic sense, as the larva and pupa differ greatly from the larvæ and pupæ of species of *Calysisme* and *Mydosama* which he has also bred from the egg laid in confinement, the larvæ of these subgenera also feeding on various species of grass. *M. medus* in Sumatra occurs all the year round, generation following generation in rapid succession. Dr. Martin notes that "The ocelli on the underside of the wings possess in this species a quite peculiar glossy surrounding, which I know to occur only in the Indian genus *Zipætes*, Hewitson."

52. MYCALESIS (*Calysisme*) PERSEUS, Fabricius.

Grose Smith as *samba* and *lalassis*. Hagen as *blasius*, var. *lalassis*, Hewitson. *M. blasius* is the wet-season, and *M. perseus* the dry-season

form of one and the same species; the latter is not found in Sumatra. *M. lalassis* is confined to Gilolo and Amboina according to Mr. Moore. Not uncommon in the plains, but occurs less frequently than *M. mineus*, Linnæus, and *M. horsfieldii*, Moore.

53. *MYCALESIS (*Calysisme*) POLYDECTA, Cramer.

Snellen as *justina*. Butler. Mr. Moore gives the "*Papilio*" *justina*, Cramer, which was described from the Coromandel Coast of South India, as a synonym of *M. polydecta*, and restricts the species to Eastern, Central, and Southern India, and Ceylon. As the figure of *M. justina* is very similar to the wet-season form of *M. mineus*, Linnæus, while the figure of *M. polydecta* reminds one at once of the recently-described *M. horsfieldii*, Moore, it is, I think, probable that Messrs. Snellen and Butler have incorrectly recorded this species from Sumatra. Dr. Hagen gives *M. justina* as a synonym of *M. mineus*.

54. MYCALESIS (*Calysisme*) MINEUS, Linnæus.

Hewitson. Grose Smith as *ostrea*. Hagen as *drusia*, and as *mineus*, Butler [sic]. Distant. Mr. Moore considers that both *M. mineus* and *M. drusia*, Cramer, represent the wet-season form of one and the same species. No dry-season form of it (*M. ostrea*, Cramer, nec *M. ostrea*, Westwood, which also equals the dry-season form of *M. mineus*), occurs in Sumatra. It is the commonest species of *Mycalesis* found in the island, and flies everywhere with *M. medus*, Fabricius, where there is grass and a little jungle for it to retire into.

55. MYCALESIS (*Calysisme*) HORSFIELDII, Moore.

Calysisme horsfieldii, Moore, Lep. Ind., vol. i, p. 197, pl. lxvi, figs. 2, 2a, 2b, male, wet-season form; 2c, dry-season form (1892).

The dry- and wet-season forms of this species differ but little. I have specimens also from Nias Island and Java. *M. mineus*, Linnæus, *M. perseus*, Fabricius, and *M. horsfieldii* all occur at the same time and place, so there can be no question of one being perhaps a seasonal form of the other. Besides, the "male-marks" of the three species differ considerably, that of the latter on the upperside of the hindwing being very much larger than those of the other two species. Dr. Martin has bred this species as well as *M. mineus*, *M. janardana*, Moore, and *M. anapita*, Moore, from eggs laid by confined females; the larval stage of all four being very similar and not easy to be differentiated, if mixed together. *M. horsfieldii* and *M. anapita* would not eat the common ubiquitous *Gramineæ*, so he had to give them other and rarer kinds of grass. *M. horsfieldii* is common in the plains of Sumatra, the female rarer than the male.

56. MYCALESIS (*Culapa*) MNASICLES, Hewitson.

M. mnasicles, Hewitson, Ex. Butt., vol. iii, pl. *Mycalesis* v, figs. 32, 33, male (1864).

Hewitson. Grose Smith. Hagen as *muasicles* [sic]. Distant. Kirby. Originally described from Sumatra. Rather rare in the forests and in pepper gardens; not found at so low an elevation even as Namoe Oekor, somewhat plentiful at Loeu Boentoe near the Battak frontier. This species is the largest of all the Sumatran *Mycalesis*, and small males only may be equalled in size by very large females of *M. mineus*, Linnæus, or *M. orseis*, Hewitson. The shape of the forewing also is very different from all our other species of the genus.

57. MYCALESIS (*Martanda*) JANARDANA, Moore.

Grose Smith. Snellen. Hagen. Distant. Occurs not uncommonly in the forests of the plains. The large deep velvety black spot — which is a “male-mark” — in and around the discoidal cell of the forewing on the upperside of the male, and the mottled underside of both wings makes this species of easy recognition. The caterpillars feed only at night. The butterfly emerges from the pupa very late in the day, not before two or three o'clock P. M., all the other species bred by Dr. Martin emerged between nine and ten o'clock A. M. It flies mostly at dawn and the dusk of the evening, and is a good example of the crepuscular habits of so many tropical butterflies.

58. *MYCALESIS (*Martanda*) MEGAMEDE, Hewitson.

Hewitson. Grose Smith. Originally described from Ternate; Hewitson records it from Macassar in Celebes, Gilolo, Batchian, Ternate, Sumatra, Malacca and Java; Moore records it from Celebes, Gilolo and Batchian. It is unknown to us.

59. MYCALESIS (*Mydosama*) FUSCUM, Felder.

Hewitson as *diniche*. Snellen. Grose Smith as *diniche* twice over. Hagen. Distant as *fusca* [sic]. Common in the forests at the foot of the hills and also in the plains, near rivers, and at Stabat. In coloration it is intermediate between the fuscous and yellow species of *Mycalesis*.

60. MYCALESIS (*Mydosama*) ANAPITA, Moore.

Hewitson. Grose Smith. Snellen. Hagen. Common in the forests of the plains.

61. MYCALESIS (*Mydosama*) MARGINATA, Moore.

Mydosama marginata, Moore, Trans. Ent. Soc. Lond., 1881, p. 307.

Moore. Hagen. Originally described from Sumatra. Occurs only

on the Central Plateau at an elevation of not less than 3,000 feet at least. It is quite common where it is found, and is endemic to the Battak mountains.

62. MYCALESIS (*Mydosama*) DOHERTYI, Elwes.

M. doherthyi, Elwes, Proc. Zool. Soc. Lond., 1891, p. 261, pl. xxvii, figs. 3, male; 4, female.

Described from Perak in the Malay Peninsula. Dr. Martin obtained a single male from Selesseh, and later a female from Soekaranda, and in 1894 one pair from Bekantschan. It is one of the rarest butterflies in Sumatra, as in thirteen years' collecting he only obtained these four specimens.

63. *MYCALESIS (*Mydosama*) ASOPHIS, Hewitson.

Grose Smith. Originally described from Mysol. Recorded also from New Guinea, Waigiou and Ternate by Moore. Unknown to us.

64. MYCALESIS (*Loësa*) OROATIS, Hewitson.

Hagen as *oroatis* and *ustulata*. Mr. F. Moore allows *L. surkha*, Marshall, to stand for this species, in preference to *L. fervida*, Butler, which is an older name, being the first published. Colonel Marshall's description of *M. surkha* was read before Mr. Butler's paper was published, but that does not give priority. *M. fervida*, *M. surkha* and *M. ustulata*, Distant, are all synonyms of *M. oroatis*, described from Java. The first two names represent dry-season, the last two wet-season forms of one and the same species. The dry-season form certainly does not occur in Sumatra, it is unknown to me if it is found in Java. *M. oroatis* is somewhat uncommon in the lower hills at Namoe Oekor, Namoe Tambis, and Bekantschan. It is the darkest of the yellow species of *Mycalesis* found in Sumatra. Females are rare.

65. *MYCALESIS MEDUSA.

Grose Smith. This species does not appear to have ever been described.

66. *MYCALESIS BOCKII.

Grose Smith. Also apparently nondescript.

It may perhaps be here noted that all the Sumatran species of *Mycalesis* are very earth-loving insects, they always keep close to the ground, which they only leave for higher flights on two occasions, viz., during the wedding flight, and when two jealous males meet and fight. *Mycalesis* are out on rainy days when there is no sun, and give on such

days some occupation and consolation to the otherwise disappointed collector. All the species are very fond of fæces of all kinds and of sweets, and are often very numerous on pieces of sugar-cane which the natives have thrown away after removing all the sweet juice possible by mastication or otherwise. They are also very partial to the red saliva of the betel-chewing natives.

67. *NEORINA LOWII*, Doubleday and Hewitson.

Hewitson as *Cyllo lowii*. Grose Smith. Snellen as *Hipio lowii*. Hagen as *Hipio lowii*. Staudinger. Distant. Kirby. Occurs only in the lower hills and is not very common, and when caught is nearly always in a damaged condition. They are very fond of the juice of some forest trees, which give forth this liquid when the bark is cut or wounded. Every observer who has seen it flying has noted its strong likeness to *Papilio helenus*, Linnæus. This, however, is not a case of mimicry but of accidental resemblance only, as *P. helenus* is not a protected butterfly. Dr. Martin considers that in its shape and habits it is very near to the genus *Melanitis*, being only a gigantic form of the genus.

68. *AMNOSIA EUDAMIA*, Grose Smith.

A. eudamia, Grose Smith, Nat. Wand. East. Arch., p. 275 (1885).

A. martini, Honrath, Berl. Ent. Zeit., vol. xxxvi, p. 439 (1891).

Grose Smith as *decora* and *eudamia*. Snellen as *decora*. Hagen as *decora*. The late Professor Westwood originally described the genus *Amnosia*, and placed it in the subfamily *Nymphalinæ* immediately before *Cyrestis*. Kirby and Staudinger retain it in the same position. The late Dr. Schatz placed it between *Stibochiona* and *Hestina*. Dr. Hagen has struck out an independent course, and places it in the subfamily *Amathusiinæ*, between *Enispe* and *Clerome*. I am of opinion that it should come into the subfamily *Satyrinæ* near to the genus *Neorina*. The presence of ocelli in the subfamily *Nymphalinæ* is rare, and when found in such genera as *Precis*, *Junonia*, *Apatura*, *Cynthia*, *Rhinopalpa*, *Doleschallia*, *Kallima*, &c., differ in character from the ocelli found in the *Satyrinæ*. The yellow form of female of *A. eudamia* agrees strikingly in shape, facies, and its naked eyes with *Neorina hilda*, Westwood, the type of the genus, having the veins of the forewing non-swollen at the base, and a broad oblique yellow band across the disc of that wing. In these features it also strongly resembles *Melanitis amabilis*, Boisduval, from New Guinea. *Amnosia* differs from *Melanitis*, however, in having the second median nervule of the hindwing arising at the end of the discoidal cell, instead of well before the end; in this it agrees with *Neorina*. *Amnosia* differs from *Neorina* in the direction of the disco-cellular nervules of the forewing; and in having the second median nervule of

that wing arising at the lower end of the cell instead of long before the end. All the genera of the *Amathusiinæ* have to my eyes a facies peculiar to themselves not seen in *Amnosia*; besides which in all the genera except *Xanthotænia* the discoidal cell of the hindwing is open or only partially closed, in the *Satyrinæ* it is closed entirely, *Amnosia* therein agreeing with the latter. The genus at present contains four species, *A. decora*, Doubleday and Hewitson, from Java, *A. eudamia*, Grose Smith, from Sumatra, *A. baluana*, Fruhstorfer, from North Borneo, and *A. decorina*, Fruhstorfer, from Nias. The male of *A. eudamia* differs from that sex of *A. decora* in having the oblique blue band on the upperside of the forewing broader, paler, and of a more silvery hue. The female of *A. eudamia* is dimorphic, one form having the band yellow, the other having it white; specimens somewhat intermediate between these two forms, the band being yellowish-white, are sometimes obtained. Dr. Martin informs me that he has received both forms of *A. decora* from Java also. He took the first white females of *A. eudamia* ever obtained to Europe in 1889, from them the late Herr Honrath created the species *Amnosia martini*, not being aware that Mr. Henley Grose Smith had already described the species from specimens obtained by Mr. Henry O. Forbes. Dr. Martin captured his first specimens himself in 1889 in Deli, south of Kampong Roemah Kenangkong. It occurs also in the forests at high elevations south of Bekantschan, in the Battak mountains, and on the Central Plateau, but is by no means common, as is the Javan species, so Mr. Fruhstorfer informs us, in suitable localities.

69. *CÆLITES EPIMINTHIA*, Westwood.

Grose Smith. Hagen. Distant. Kirby. Rare, and occurs in dense forests only as high as Namoe Oekor.

70. *CÆLITES HUMILIS*, Butler.

Grose Smith as *euptychoides* [sic]. Hagen as *euptychoides* [sic]. Very rare, Dr. Martin has obtained two or three specimens only. It may be known from the *C. euptychioides* of Felder, which is apparently confined to Borneo, by the female being devoid of all ultramarine-blue coloration on the upperside of the hindwing. The pupils of the ocelli on the underside of all the species of the genus are of a lovely iridescent blue colour which is only visible in some lights. This is also the case in the allied genus *Ptychandra*, Felder, from the Philipines.

71. **CÆLITES NOTHIS*, Doubleday and Hewitson.

Hagen. This rare species was described from "East India." M. Charles Oberthür possesses two males and a female, and there is a

female in the British Museum ; these are all the known specimens. Its precise habitat is unknown.

In Sumatra the species of *Cœlites* are inhabitants of dense virgin forests, are very shy, but settle often, and can only be captured by approaching them most gently and carefully. They always rest with folded wings, and are not easily seen on the dark ground covered with leaves of all shades in the dim recesses of the forest. Their shyness and the difficulty of discovering and capturing them may be the real reason why they are so seldom met with in collections. Dr. Martin is of opinion that *Neorina lowii*, Doubleday and Hewitson, is a gigantic *Melanitis*, so he would call the species of *Cœlites* the *Melanitis* of the forest. Being true forest insects they exhibit a beautiful glossy blue colour (confer *Mycalesis orseis*, Hewitson, *ante* No. 50).

72. LETHE (*Nemetis*) MINERVA, Fabricius.

Hewitson as *arcadia*. Grose Smith as *arcadia*. Snellen as *arcadia*. Kirby. Apparently very rare in North-Eastern Sumatra, Dr. Martin having obtained one specimen only from the mountains. It is far less rare in Java.

73. LETHE (*Debis*) MEKARA, Moore.

Hewitson. Grose Smith. Hagen. Semper. Snellen. Common everywhere in the plains, in the mountains, and even on the Central Plateau ; the specimens from the mountains have the yellowish-red colour on the upperside of the hindwing more extensive than those from the plains. The insect is always met with near bamboos, on which the larva feeds, and is even very common in Bindjei.

74. LETHE (*Debis*) CHANDICA, Moore.

Hagen. Very rare, in the higher mountains and on the Central Plateau. Dr. Martin has not obtained more than ten or twelve specimens during his long sojourn in the island.

75. LETHE (*Debis*) DARENA, Felder.

L. darena, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. viii, p. 40, n. 3, pl. K, fig. 7, *male* (1893).

Very rare in the Battak mountains, and not found below 3,000 feet elevation. Dr. Martin wishes to add:—"I cannot lose this opportunity to present my compliments to my friend Mr. Lionel de Nicéville for his extraordinary entomological knowledge and keen insight in having seen only the drawing of the very different female of *Lethe darena* in Dr. Felder's *Reise Novara*, Lepidoptera, and from that being able to deter-

mine the first male obtained by me, which I took to him on paying my first visit to Darjiling, after I had had the animal returned to me as undeterminable from Berlin. Afterwards I sent collectors especially to the mountains to obtain females, when de Nicéville's identification was splendidly confirmed. As far as I am aware, no specimens from Java, from whence this species was first obtained, have been recorded since the female was described by Dr. Felder. *L. darena* is doubtless one of the rarest, as well as one of the most beautiful, if not the most beautiful, species in this large genus."

76. LETHE EUROPA, Fabricius.

Snellen. Hagen as *europa* and *arete*. Distant. Occurs in nearly the same localities as *L. mekara*, Moore, and has the same habits but is considerably rarer, especially the female. Dr. Hagen records both *L. europa* and *L. arete*, Cramer, from Sumatra. The latter, according to Mr. F. Moore, is found in the Sula islands and Amboina only, while *L. arcuata*, another allied species described by Butler, is confined to Celebes.

77. LETHE ROHRIA, Fabricius.

Snellen. Hagen. A common species, but confined to the Central Plateau of the Battak mountains.

78. *YPTHEMA CEYLONICA, Hewitson.

Elwes. Unknown to us from Sumatra. It occurs on the eastern coast of India (Orissa and Ganjam), in South India, and in Ceylon.

79. YPTHEMA BALDUS, Fabricius.

Hewitson. Grose Smith. Hagen as *methora*, Fabricius [sic]. Elwes. Probably the commonest species of *Ypthima* in the plains and found everywhere. The larva feeds on the same ubiquitous *Gramineæ* as *Mycalesis mineus*, Linnæus. Dr. Hagen evidently followed Mr. W. L. Distant in Rhop. Malay., who described and figured this species erroneously under the name of *Y. methora*, Hewitson. No species of *Ypthima* presents dry-season forms in Sumatra, all are strongly ocellated.

80. YPTHEMA IARBA, de Nicéville.

Y. iarba, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. 18, n. 4, pl. R, figs. 7, male; 8, female (1895).

Very rare, in all Dr. Martin has not obtained more than a dozen specimens. It is of large size, 1.6 to 1.8 inches in expanse, and has five ocelli only on the hindwing, a pair at the anal angle, a pair in the median interspaces, and a single one in the upper subcostal interspace.

81. *YPTHEMA PHILOMELA*, Johanssen.

Snellen as *hübneri*. Hagen as *hübneri*. Distant as *hübneri*. Common everywhere in the plains like *Y. baldus*, Fabricius. I follow Mr. Moore in my identification of this species (*Lep. Indica*, vol. ii, p. 74, pl. cx, fig. 4, *male* (1893), which he records from Sumatra. It is of small size, has six ocelli in pairs on the underside of the hindwing, and has an inconspicuous patch of androconia on the upperside of the forewing. The *Y. huebneri* of Kirby, under which name the present species has apparently been recorded by three writers from Sumatra, is quite a distinct species, with no "male-mark," and with four ocelli only placed one and three, and does not appear to occur in the island. The *Y. tabellia* of Marshall, from South India and Burma, of which the type specimen is in my collection, appears to me to be the same as *Y. philomela* of Johanssen. Mr. Elwes in his monograph of the genus *Ypthima* places the "*Papilio*" *philomela*, Johanssen, as a synonym of *Y. baldus*, Fabricius, but with a query. He gives *Y. tabella* as a certain synonym of *Y. baldus*. Nowhere does Mr. Elwes refer to the *Y. philomela* of Linnæus. All Mr. Moore says about it is that it is quite distinct from *Y. hübneri*, Kirby, and has six ocelli on the hindwing disposed in three pairs (*Lep. Ind.*, vol. ii, p. 81). I am, therefore, quite in the dark as to how *Y. philomela*, Johanssen, and *Y. philomela*, Linnæus, are supposed to differ. Mr. Moore gives the *Y. philomela* of Hübner as a synonym of *Y. huebneri*, Kirby.

82. *YPTHEMA PANDOCUS*, Moore.

Snellen. Hagen. Distant as *corticaria*. Occurs in Sumatra only on the Central Plateau of the Battak mountains at an elevation of not less than 3,000 feet. Mr. Moore retains *Y. corticaria*, Butler, as a distinct species; I quite agree with Mr. Elwes in placing it as a synonym of *Y. pandocus*. Mr. Distant treats *Y. corticaria* as a "var." of *Y. pandocus*.

83. *YPTHEMA FASCIATA*, Hewitson.

Hewitson. Grose Smith. Distant. Kirby. Elwes. Decidedly rare, occurs only in the forests of the lower hills rarely at Namoe Oekor, but never at a lower elevation. Like the species of *Mycalesis* all the species of *Ypthima* are not as fond of the sun as most other butterflies, and fly on rainy days. They are partial to flowers, and will even go to high shrubs when in blossom, which *Mycalesis* will never do.

84. *RAGADIA CRISIA*, Hübner.

Hewitson. Snellen. Hagen. Distant. A common species in the plains and is found not only in the large and high forests, but also in young and not very high jungle with the ground covered with grass which

it prefers. Often met with in pepper gardens; plentiful at Batoe Gadjah near the Begoemit river. It has a very weak flight, often settles, and is easily captured. It is very variable in both the shade of the ground-colour of the upperside and the extent of the white on the underside, some specimens having the white bands fully twice as broad as others.

85. **RAGADIA MAKUTA*, Horsfield.

Mr. Moore records *R. crisis*, Hübner, from the Malay Peninsula and Borneo, and *R. makuta*, Horsfield, from Sumatra and Java. I have an extensive series of *Ragadias* from all these localities, and while these specimens shew great variation in the colour of the ground and the respective width of the bands, it appears to me obvious that they all represent one species. Until the publication of vol. ii of Mr. Moore's "Lepidoptera Indica," p. 113 (1893), *R. makuta* was always given as a synonym of *R. crisis*, and Mr. Moore in that work does not give his reasons for separating them.

86. *ERITES ELEGANS*, Butler.

Hagen. The rarest of the three Sumatran species of the genus.

87. *ERITES ARGENTINA*, Butler.

Grose Smith as *madura* [sic]. Hagen. Somewhat rare.

88. *ERITES ANGULARIS*, Moore.

Hewitson as *madura* [sic], var. The commonest species of the genus occurring in Sumatra. *E. medura*, Horsfield, is confined, as far as our present knowledge extends, to Java and Palawan in the Philippines. All the species of *Erites* are true forest butterflies, and they are not only found in the large virgin forests, but also in younger jungle with plenty of grass under foot. At an elevation of 1,200 feet they disappear. On the wing they remind one of *Ragadia*, as they also have a very weak flight, and often settle with closed wings. It is a very interesting fact that in such a relatively small area as are the districts of Deli, Langkat, and Serdang, three quite distinct species of this rather small genus should be found. (*Confer* de Nicéville, Journ. A. S. B., vol. lxii, pt. 2, p. 1 (1893).

89. *MELANITIS ISMENE*, Cramer.

Hewitson as *Cyllo leda*. Snellen as *Cyllo leda*. Hagen as *leda* and *ismene*. Distant as *leda* and *ismene*. The dry-season form (*ismene*) and wet-season form (*determinata*, Butler), occur together at the same time

and at all seasons of the year, but are most plentiful in the rainy-season from October to January in rice-fields, on which the larva feeds, as well as on certain coarse species of grass. It is delightful to a lepidopterist who loves insects alive in their native haunts as well as dead, dried, and pinned in his cabinets to see two males fighting together and flying up very high into the air, then returning with periodical regular movements to the spots from whence they started. As this happens mostly after sunset, the silhouettes of the insects are very sharp and clear against the golden evening sky of the tropics. In consequence of the well-known habit of *Melanitis* to be on the wing before sunrise and after sunset, it sometimes comes into the lighted open verandahs of the houses—quite a stranger amongst a crowd of moths and insects of all orders.

90. MELANITIS BELA, Moore.

Hagen as *suyudana*. Semper as *suyudana*. Decidedly rare, and has nearly the same habits as *M. ismene*, Cramer, but prefers small jungle rather than the borders of fields, gardens, &c. Like *Neorina lowii*, Doubleday and Hewitson, it is exceedingly fond of the sap from certain trees. Dr. Hagen has quite correctly observed that in the early morning hours *M. bela* is still earlier on the wing than *M. ismene*, and that it has already retired to rest as that species and some *Mycalesis* appear. *M. bela* occurs under two forms:—the one which corresponds to the wet-season form of the species in India (*aswa*, Moore), has the upperside of the wings in the male velvety-black, with the apex of the forewing but very slightly angulated; the other, which corresponds to the dry-season form of the species in India (true *bela*), has the upperside of the wings in the male much paler, of a rusty-brown hue, often with subapical spots in the forewing on the upperside, with the apex of the wing strongly angulated. The first of these forms equals *M. abdullæ*, Distant, the second *M. suyudana*, Moore. Mr. Moore in *Lep. Ind.*, vol. ii, p. 137, continues to keep the two last-named species distinct, and records it from Sumatra under the name of *M. suyudana*, but as I possess good series of both from the localities whence they were described, I have no hesitation in sinking them both as synonyms of *M. bela*.

91. MELANITIS ZITENIUS, Herbst.

Distant. The rarest species of the genus occurring in Sumatra, and found only at the higher elevations from 500 to 2,000 feet. In thirteen years Dr. Martin has obtained a dozen specimens perhaps.

Subfamily ELYMNIINÆ.

92. ELYMNIAS NIGRESCENS, Butler.

Hagen. I have found great difficulty in identifying satisfactorily the common species of *Elymnias* of the *undularis* group occurring in Sumatra. Mr. Distant seems to have had similar difficulty with the Malay Peninsula species, *vide* Rhop. Malay., p. 61. *E. nigrescens* was described by Butler from Sarawak, Borneo, both sexes are described and one is figured, but it is not stated whether that figure was taken from a male or a female, but probably the latter. I have nothing very like it from Sumatra or Borneo. Distant figures two female specimens from the Malay Peninsula, which were presumably compared with the types, besides which Mr. Butler himself records *E. nigrescens* from the Malay Peninsula. Our specimens agree very fairly with Distant's two figures, so I have adopted the name he uses for it. The males have sometimes no blue coloration on the upperside of the forewing whatever, sometimes there is a more or less complete series of marginal spots, which are most prominent at the apex of the wing. The hindwing is usually immaculate, but sometimes there is a marginal series of whitish spots. The female is very similar to the male, but the ground-colour of the upperside is paler and more reddish, and the blue spots are usually more prominent. Sumatran specimens of both sexes are frequently smaller and duller-coloured than specimens from the Malay Peninsula and Borneo. No orange form of female (*E. undularis*, Drury, from India; *E. tinctoria*, Moore, from Burma; *E. fraterna*, Butler, from Ceylon; *E. discrepans*, Distant, from the Malay Peninsula; and *E. protozenia*, Cramer, from Java) is ever found in Sumatra. This species is by far the commonest of the subfamily occurring in the island, and is found in the plains all the year round in ever succeeding generations. The larva feeds on the rattan cane, and doubtless on various species of palms also.

93. *ELYMNIAS LEUCOCYMA, Godart.

Hagen as *leucocyma*, Godardt [sic]. This species was described from males from Java, and is evidently very closely allied to *E. undularis*, Drury, from India. May not *E. leucocyma* be a synonym of *E. protozenia*, Cramer? It is doubtful if two distinct species of this group are found in Java. Dr. Hagen records two species of *Elymnias* of this group from Sumatra, but I have only seen one, which, however, is decidedly variable, but cannot in my opinion be split up into separate species.

94. ELYMNIAS LUTESCENS, Butler.

Grose Smith as *panthera*. Hagen. Butler. Distant. Kirby.

Staudinger as *panthera*, Fabricius, var. *lutescens*, Butler. Wallace. Very rare in the forests of the plains and as high as Namoe Oekor. This insect is perhaps not really as rare as it appears to be; as it greatly resembles on the wing a brown *Euploea*, it probably often from this cause escapes the notice of the collector.

95. ELYMNIAS DARA, Distant.

E. dara, Distant, Ann. and Mag. of Nat. Hist., fifth series, vol. xix, p. 50, n. 36 (1887).

This species was described from Northern Borneo. An allied species is the *E. albofasciata*, Staudinger, from Palawan in the Philippine Isles, described in Iris, vol. ii, p. 39 (1889). We have not had the opportunity of comparing *E. dara* and *E. albofasciata* from typical localities, but a female of the latter from Palawan kindly sent to me by Dr. Staudinger agrees exactly with Sumatran specimens of the same sex. The Burmese species, *E. dædalion*, de Nicéville, is certainly distinct from the Sumatran and Philippine form which we here identify as *E. dara*, but whether it is separable from *E. dara* from Borneo we cannot say. It is very rare in Sumatra, and has been brought in from the Gayoe and Battak mountains from high elevations only.

96. ELYMNIAS (*Melyniás*) LAISIDIS, de Nicéville, n. sp.

Grose Smith as *lais*. Hagen as *lais*, Horsfield and Moore [*sic*]. Wallace as *lais*. Distant as *lais*.

HABITAT: N.-E. Sumatra.

EXPANSE: ♂, 2·9 to 3·3; ♀, 3·5 to 3·7 inches.

DESCRIPTION: MALE. Very similar to *E. lais*, Cramer, from Nias, Java, and Borneo. FEMALE. In general appearance very similar to the same sex of *E. malelas*, Hewitson, from Sikhim, Bhutan, Assam, and Burma, the wings being greatly elongated, and the *forewing* on the UPPERSIDE having the apical half strongly washed with purple.

I possess a single female only of *E. lais* from Java, from which the female of *E. laisidis* differs in its more elongated forewing glossed with purple on the upperside. Dr. A. R. Wallace has described but not named the Sumatran form of *E. lais* in Trans. Ent. Soc. Lond., 1869, p. 325, n. 11. *E. laisidis* occurs nearly always near human habitations, and Dr. Martin feels sure that the larva feeds on bamboos, as the females are always seen flying along the bamboo hedges surrounding the gardens of Malay houses. It occurs most commonly in December and January, and in some years (1892 and 1893) was unusually abundant, being seen almost in swarms. In India the allied *E. timandra*, Wallace, has been noted in the Khasi Hills of Assam occurring in

thousands in some years in a similar manner. In other years *E. laisidis* is very rare, and then found near the sea coast (at Laboean) commoner than higher up. The female, on the vivid blue coloration of the upper-side of the forewing of which the species is mainly based, is undoubtedly a very splendid mimic of *Euplœa linnœi*, Moore.

97. ELYMNIAS (*Melynias*) CERYXOIDES, de Nicéville.

E. (Melynias) ceryxoides, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. 22, n. 7, pl. S, fig. 13, *male* (1895).

Grose Smith as *ceryx*. Hagen as *ceryx*. Occurs only on the Central Plateau at not less than 3,000 feet elevation, and similarly to *E. laisidis* is found in June and July, but chiefly in December and January. Dr. Martin's brother, Dr. F. Martin, took it on the southern extremity of the Toba Lake near Batoe Gadjah, which is higher than the plateau.

98. ELYMNIAS (*Melynias*) ERINYES, de Nicéville.

E. (Melynias) erinyes, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. 19, n. 5, pl. R, figs. 9, *male*; 10, *female* (1895).

A very rare species found only in the high forest at Selesseh and up to the lower slopes of the hills at Bekantschan, and in the Battak mountains in September. Dr. Martin has obtained three specimens only. It is nearly allied to *E. casiphone*, Hübner, more closely to *E. kamara*, Moore.

99. ELYMNIAS (*Melynias*) DOHRNII, de Nicéville.

E. (Melynias) dohrnii, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. 21, n. 6, pl. S, fig. 12, *male* (1895).

This species was described from a single male obtained in September, 1894, at Bohorok near the Battak frontier by Herr M. Ude, the European collector of Dr. H. Dohrn of Stettin. As Bohorok is on the way to the Gayoe and Allas countries, it is possible that this *Elymnias* may occur there more plentifully, as these regions are quite unknown. It is allied to *E. patna*, Westwood.

100. ELYMNIAS (*Bruasa*) SUMATRANA, Wallace.

Wallace. Kirby. Grose Smith as *sumatrana* and *penanga*. Hagen as *penanga*, Westwood, var. *sumatrana*. Originally described from Sumatra. A very rare species. It occurs in March in the forests near the sea together with *Euplœa eunus*, de Nicéville. The female may be considered to be one of the rarest butterflies of our region; in all the time Dr. Martin was in Sumatra he only obtained three specimens, one of

which he caught himself in a forest near the Saentis Estate, not more than two miles from the sea.

101. ELYMNIAS (*Bruasa*) ABRISA, Distant.

Very rare in the high forest near Selesseh in July and at Namoe Oekor. Both sexes are described by Mr. Distant, and the male is figured. We have seen only seven female specimens. But for the fact that Mr. Distant describes the male, we would certainly have considered this species to be a dimorphic form of the female of *E. sumatrana*, Wallace.

102. ELYMNIAS (*Agrusia*) ESACOIDES, de Nicéville.

Dyctis esacoides, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. vii, p. 323, n. 2, pl. H, fig. 2, male (1892).

Exceedingly rare, three specimens only have been obtained, one in the forest near Selesseh in July, two from the lower hills. All the rarer species of *Elymnias* have a soft weak flight and settle often with folded wings. They are very fond of shadowy spots and of rest, and once settled they remain for a long time, leaving their resting places only when frightened or driven away. As they all rest with shut wings they are in this position much less conspicuous than when on the wing.

Subfamily AMATHUSINÆ.

103. ZEUXIDIA AMETHYSTUS, Butler.

Hagen. Kirby. Butler. Distant. Staudinger. Rare; found only in dense virgin forests like all the rest of the genus not at a lower elevation than Bekantschan in September. It occurs higher in the hills than any other *Zeuxidia*. The female has the macular band on the upperside of the forewing ochreous-white.

104. ZEUXIDIA NICEVILLEI, Fruhstorfer.

Z. nicévillei, Fruhstorfer, Ent. Nach., vol. xxi, p. 196 (1895).

Fruhstorfer. Described as being a local form of *Z. doubledaii*, Westwood. The latter was described from a female specimen from "India," and is somewhat roughly figured in the Genera of Diurn. Lep. on pl. lii, fig. 1. Distant figures both sexes and records it from Penang and Perak. Moore records it from Penang. I have compared both sexes from Perak with both sexes from Sumatra, and Sumatra females with Hewitson's original figure, and can discover no differences whatever. Herr Fruhstorfer has recently been to London and has probably compared his types of *Z. nicévillei* with the type of *Z. doubledaii*, so

on his authority I maintain the species as distinct. In Sumatra *Z. nicévillei* is rather more common than *Z. amethystus*, Butler, and it occurs at Bekantschan and Selesseh in June and August, and even at Batang Serangan, still nearer the sea; also in Asahan. The female has the macular band on the upperside of the forewing violet-white.

105. * *ZEUXIDIA LUXERII*, Hübner.

Grose Smith as *Amathusia* [sic] *luxerii*. Only known to us from Java, where it is the commonest species in the genus.

106. *ZEUXIDIA (Amaxidia) AURELIUS*, Cramer.

Grose Smith as *Amathusia* [sic] *aurelius*. Staudinger. Kirby. Distant. This species was originally figured and described by Cramer from a female obtained on the west coast of Sumatra. Occurs from Selesseh to Bekantschan and even higher in May and September; is rarer than the other species of the genus. The female often measures six and a half inches across the wings, and is one of the largest-known *Rhopalocera* in total wing area. The female has the band on the upperside of the forewing white. All *Zeuxidias* are only met with in large high forest near small streams, on whose borders there are usually some bamboos, on the leaves of which most probably the larva feeds. They fly rapidly but settle often, but always in a dense mass of branches and stems of bushes, so that they are very difficult to secure. The best way to collect them is to place rotten plantain fruit (pisangs or bananas) along the streams they haunt, to which they will come. The males of all our *Zeuxidias* are true inhabitants of the forest, and exhibit rich blue colours on the upperside. When settled with closed wings their very great resemblance to dead leaves on the underside makes them very difficult to distinguish amongst the true dead leaves which always and at all seasons strew the forests in the tropics. In South-East Borneo (Bandjermassin) all species of *Zeuxidia* appear to be far commoner than they are in Sumatra, the Malay Peninsula and Burma. Out of 1,000 specimens of butterflies Dr. Martin received from thence, 200 were three species of *Zeuxidia*.

107. *AMATHUXIDIA DILUCIDA*, Honrath.

Occurs only in high forest in July, and is found up to the elevation of Bekantschan. Very rare, Dr. Martin obtained five specimens only in thirteen years; one pair from Aer Kesoengei in Asahan. It has the same habits as *Zeuxidia*, and is difficult to secure.

108. *AMATHUSIA PHIDIPPUS*, Johanssen.

Grose Smith. Snellen. Semper. Distant. Hagen. It sometimes

does great damage to the beautiful green leaves of the young cocoa-nut palms, *Cocos nucifera*, Linnæus, on which the larva feeds, and which after some while present the appearance of ugly dried-up brushes. The larva also ate the leaves of other palms in Dr. Martin's garden at Bindjei, for instance the African oil palm and the common Palmyra or fan-leaf palm. The caterpillars live socially when young, but separate after changing their last skin. They are green with reddish-brown hairs. The larva of a large Skipper, *Hidari irava*, Moore, feeds at the same time on the leaves of *Cocos nucifera*, and the two species often have a severe struggle to live together, in which the more robust hesperid, which secures a shelter for itself by spinning the leaves together, is generally victorious. The pupa is uniform light green, and hangs perpendicularly on horizontal leaves. The butterfly appears most commonly in December and January, after which time only single specimens are seen. In the daytime it is only found in places where there is deep shade, it never ventures out into the open sunlight, but is most active after sunset, and like *Melanitis* comes sometimes to the lamps. In its predilection for shade it often enters houses and sheds. It is a very variable species.

109. *AMATHUSIA SCHOENBERGI*, Honrath.

A. schönbergi, Honrath, Berl. Ent. Zeitsch., vol. xxxi, p. 347, pl. vi, fig. 1, male (1887).

This species was originally described from Tanyong Malim, Perak, Malay Peninsula. It appears to be a distinct species, while *A. ochraceofusca*, Honrath, and *A. phidippus*, var. *perakana*, Honrath, both from Perak, seem only to be varietal forms of *A. phidippus*, Johanssen. It is the *Amathusia* of the forest, as it occurs only in high forest from Selesseh to Bekantschan. As in the forests there are no cocoa-nut trees, that palm being nearly domesticated, *A. phidippus* does not occur there, but is replaced by the far finer and deeper-coloured *A. schoenbergi*. Dr. Martin's Javan collector Saki observed a female of this species depositing eggs on *Areca nibong*, which palm only grows in the forest, and there is not any doubt that the larva of *A. schoenbergi* feeds on this plant, round groups of which Dr. Martin always noticed the imagines flying. It is, however, a very rare species.

110. *THAUMANTIS ODANA*, Godart.

Grose Smith. Hagen as *klugius*. Staudinger. Distant. The commonest species of the genus in Sumatra, next to *T. lucipor*, Westwood; it is found from Bekantschan to Soengei Batoe, and is therefore the most alpine species of the genus.

111. *THAUMANTIS (Kringana)* NOUREDDIN, Westwood.

Occurs at the lowest elevations and nearest the sea of all the species in the genus, as nearly all specimens obtained by Dr. Martin came from Kampong Stabat, and were caught in forests on both sides of the Wampoe River. He also obtained one pair as far south as Asahan.

112. *THAUMANTIS (Kringana)* LUCIPOR, Westwood.

The commonest of the three Sumatran species of the genus. It appears as low down as Bindjei, and is found as high as Namoe Oekor. Dr. Martin caught his first specimen of this species, a female, in June, 1888, at 7-30 p. m., flying along the white walls of his hospital so that he could just distinguish it to be a butterfly. In this species the blue reflections of the male on the upperside of both wings are so richly brilliant and powerful that in opening the wings of a closed specimen the pinchers used are strongly coloured with blue like the wings. All *Thaumantides* are inhabitants of the high virgin forest. They all like shade, and are on the wing very late after sunset. All are fond of the ripe fallen fruit of the Sumatran sugar-palm (*Arenga saccharifera*) on which they regale themselves in the shadow of the tree. They rest with closed wings, and only display their rich blue coloration when on the wing.

113. **TENARIS BIRCHI*, Distant.

Originally described from Singapore. Recently taken by Dr. Hagen in Mandaheling, a Malay state in Western Sumatra.

114. *DISCOPHORA NECHO*, Felder.

Hagen as *necho*, Felder, var. *cheops*, Felder. Staudinger as *cheops*. Semper as *cheops*. I described this species as *D. dis* (Journ. Bomb. Nat. Hist. Soc., vol. vii, p. 325, n. 3, pl. H, fig. 3, *male* (1892)). *D. necho* is a common species, and is found also in Java and Borneo. Semper records *D. celinde*, Cramer [should be Stoll] as well as *D. necho* from Sumatra. As *D. celinde* was described from Java where *D. necho* also occurs undoubtedly, it may be that both *D. celinde* and *D. necho* occur also in Sumatra. *Amathusia phidippus*, Johanssen, is the commonest, and *D. necho* the next commonest species of the subfamily in Sumatra. The males are very fond of frequenting fæces on roads, from which they fly into the jungle when disturbed, but return again as soon as danger is past. The females are much rarer, and only fly in the evening after sunset and then only very high up in the air, so that they can hardly be distinguished from

Melanitis, *Amathusia* and *Thaumantis* flying at the same time. Only when they come down to rest, or to deposit their eggs are they caught. The larva feeds on different *Gramineæ*, Dr. Martin has found them even on the famous Lalang grass (*Imperata arundinacea*), and on the sugarcane (*Saccharum officinale*). The larvæ always keep in pairs, never more than two together; they rest with the head downwards, and eat the lower portions of the leaves on which they rest. The pupa is quite green, and is very similar to that of *A. phidippus*. *D. necho* is not found at a higher elevation than Bekantschan. It is probable that *D. necho*, Felder, *D. cheops*, Felder, and *D. dis*, de Nicéville, from Java, Borneo and Sumatra respectively, all represent a single species, of which the first-named is the oldest.

115. DISCOPHORA SONDAICA, Boisduval.

Hagen. Distant. Dr. Hagen records *D. tullia*, Cramer, as well as this species from Sumatra, but according to Mr. Moore, *D. tullia* is confined to China, especially to Hongkong. In all Dr. Hagen records four species of *Discophora* from Sumatra; we know two only. It is found at lower elevations than *D. necho*, Felder, not much higher than Bindjei, where it is not uncommon near bamboo hedges. The females as usual in the genus are much rarer than the males. Dr. Martin obtained his first female from a pupa which he found near the manager's house of the Bekalla Estate under the roof of a small attap shed on the riverside near a thicket of bamboos. The female is much more beautiful than the same sex of *D. necho*, which has only a broad oblique yellow band across the forewing on the upperside.

116. ENISPE EUTHYMIUS, Doubleday.

Hagen as *eutymius* [sic]. Sumatran specimens resemble the dark form of this species found in Assam and Burma which has been named *E. tessellata* by Mr. Moore, but which is certainly not a distinct species, as it is found in some localities with, and grades imperceptibly into, the typical form. Its occurrence in Sumatra while apparently absent from the Malay Peninsula is an interesting fact in geographical distribution. It is everywhere rare, and in Sumatra is found only on the Central Plateau, and is occasionally brought in by the Battak collectors. Dr. Hagen states that he has always obtained this species together with *Limenitis bockii*, Moore, which is a curious coincidence.

117. CLEROME ARCESILAUS, Fabricius.

Grose Smith. Snellen. Hagen. Distant. The commonest species of the genus in Sumatra as elsewhere.

118. CLEROME KIRATA, de Nicéville.

C. kirata, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. vi, p. 344, n. 2, pl. F, fig. 3, male (1891).

The rarest of the three Sumatran species of the genus, and found in the same localities as *C. arcesilaus*, Fabricius. I have no difficulty in distinguishing the species, though Colonel Swinhoe fails to recognise it, *vide* his remarks on *C. arcesilaus* in Trans. Ent. Soc. Lond., 1893, p. 276, n. 77. The male was chiefly defined by a difference in the prehensores, but the superior width of the dark bands on the underside of both wings, and the anal half of the hindwing being very much darker than the same area in *C. arcesilaus* will enable one to distinguish the species superficially without recourse to an anatomical investigation. The female has the ground-colour on the underside of both wings much lighter than in *C. arcesilaus*, and all the bands consequently more prominent; they are also much wider.

119. CLEROME GRACILIS, Butler.

Hagen as *gracilis*. *C. gracilis* is met with somewhat higher than *C. arcesilaus*, Fabricius, and is also rarer than that species. All the species of *Clerome* are true insects of the virgin forest, never leave the ground for a high flight, and prefer to settle on the bare soil or on a dead and discoloured leaf than on living green leaves or shrubs. They rest with folded wings, and fly only for short distances, and then again settle. No species occurs at a higher elevation than Bekantschan, nor nearer the sea than Bindjei.

120. XANTHOTÆNIA BUSIRIS, Westwood.

Hagen. Grose Smith as *Clerome* [sic] *busiris*. Butler. Distant. Found from Bindjei to Bekantschan. Like *Clerome* it is a true inhabitant of the forest, but has a higher and longer flight than species of that genus and is not so easily caught, as it is always changing the direction of its flight. It is fond of newly cut ditches through the forest, along which it may always be found.

Subfamily ACRÆINÆ.

121. PAREBA VESTITA, de Nicéville, n. sp.

Acræa vesta, Snellen (*nec* Fabricius), Midden-Sumatra, Lepidoptera, p. 13, n. 1 pl. ii, figs. 3-5, female (1892).

Snellen as *terpsichore*, Linnæus [sic], and *vesta*. Hagen as *vesta*.

HABITAT: N.-E. Sumatra.

EXPANSE: ♂, 2.0 to 2.5; ♀, 2.4 to 2.5 inches.

DESCRIPTION: MALE and FEMALE. UPPERSIDE, both wings differ

from *A. vesta*, Fabricius, from the Himalayas, Assam, Upper Burma and Java in having the ground-colour more ochreous (less tawny), and all the veins more heavily defined with black. *Forewing* has a broad costal black margin reaching the subcostal nervure; the outer margin has the black border nearly twice as broad, with the marginal series of spots of the ground-colour obsolete or entirely absent. *Hindwing* has the black margin much broader, with the yellow marginal spots very much smaller. **UNDERSIDE**, *both wings* differ only in having all the veins more strongly defined with black.

Occurs only on the Central Plateau, where it appears to swarm to the same extent as the allied species does in Sikhim and elsewhere. Dr. Martin has had the larva and pupa brought to him by his collectors. It flies all the year round, and there is often an over population, after which it becomes somewhat scarce for a while till it recovers itself and again becomes common.

Subfamily NYMPHALINÆ.

122. *ERGOLIS ARIADNE*, Linnæus.

Snellen. Wallace. Hagen. Distant. This species may be known from the one that follows by its richer brighter tawny coloration, by the outer margin of both wings being much more irregular, and in the male by the "male-mark" present on the underside of the forewing, which, in this species, is a solid shining deep black patch reaching from near the inner margin to the third median nervule. Its larva feeds on the stinging creeper, *Tragia involucrata*. The butterfly is only found in the forest from Bindjei to Bekantschan, and always near its food plant. It has a low flight, only males when fighting fly high in the air.

123. *ERGOLIS ISÆUS*, Wallace.

E. isæus, Wallace, Trans. Ent. Soc. Lond., 1869, p. 333, n. 4.

Wallace. Kirby. Hagen as *taprobana*. Distant. Nearly allied to but quite distinct from *E. merione*, Cramer. The outer margin of both wings is much more even and regular than in the preceding species, and the coloration is duller and darker. The "male-mark" is in a similar position, but is very inconspicuous and consists of a broad line of modified black scales extending along either side of the veins on the disc of the forewing on the underside, but not reaching the outer margin nor the costa. *E. merione* has a quite different "male-mark," which is similar to that in *E. ariadne*, Linnæus. I have specimens of *E. isæus* from Myitta in Burma and from Singapore; Wallace records it from Singapore

also and Sumatra. The larva feeds on *Ricinus communis*, Linn., the castor-oil plant. Occurs everywhere in the plains and all the year round, mostly near the houses of Indian (Tamil) coolies, who are very fond of cultivating the castor-oil plant. Its flight is perhaps lower and weaker than that of *E. ariadne*, Linnæus. Dr. Hagen records *E. taprobana*, Westwood, from Sumatra, a species confined to South India and Ceylon as far as our experience goes. It is a very noticeable fact that everywhere two quite distinct species of *Ergolis* occur together.

124. *EURYTELA HORSFIELDII*, Boisduval.

Hagen. Grose Smith.

125. *EURYTELA CASTELNAUI*, Felder.

Snellen. Hagen. Grose Smith. Both the Sumatran species of this genus occur only in forests, and are somewhat rare insects, the female being the rarer sex of the two. *E. horsfieldii*, Boisduval, occurs more in the plains, from Bindjei to Namoe Oekor; *E. castelnaui* at higher elevations, from Namoe Oekor to Soengei Batoe. The females are splendid mimics of the two preceding species of *Ergolis*, *E. castelnaui* mimicking *E. isæus*, Wallace, and *E. horsfieldii* mimicking *E. ariadne*, Linnæus. Even in the way of flying they closely resemble the flight of species of *Ergolis*. Dr. Martin obtained his first female of *E. castelnaui* while catching *E. isæus* on the same spot in a forest south of Namoe Oekor. The males always settle with folded wings for greater protection, and have some predilection for the sandy banks of small streams running through the forest.

126. *EURIPUS HALITHERSES*, Doubleday and Hewitson.

Hagen as *halitherses* and *euplæoides*. Staudinger. The male differs from typical *E. halitherses* in having the marginal dots on both sides of the forewing restricted more to the anal angle. The female is trimorphic, in one form the ground-colour is brown as in typical *E. euplæoides*, Felder; in the second form it is indigo-blue; in the third form it is blue without white patches on both wings and mimics *Euplæa linnæi*, Moore. The first two forms seem to be mimics of *Euplæa diocletianus*, Fabricius. As usual, the amount of white coloration on the wings in the female is very variable, and on that character no species should be based. One of these inconstant forms has recently been described by Mr. Distant as *E. borneënsis*, and seems to be intermediate between *E. euplæoides* and *E. pfeifferæ*, both of Felder, from the Malay Peninsula. This species was, before the forests of Deli and Langkat fell victims to the triumphal march of the tobacco cultivation,

a fairly common insect, of which the males often escaped capture by being mistaken for a still commoner species of *Athyma*. Even now on the frontiers of tobacco-land, as at Selesseh, *E. halitherses* is not rare, only the females are scarce. The males have a strong short flight like species of *Athyma*, whereas the females on the wing mimic different species of *Euplœa*, having a slow and sailing motion. Dr. Martin possesses a single male almost without white markings on the upperside of the forewing, which for a long time he thought represented a second species, but as he never obtained a second specimen, it is probably an aberration. *E. halitherses* extends from Bindjei to Bekantschan, and is found only in forests.

127. CUPHA ERYMANTHIS, Drury.

Snellen. Hagen. Occurs everywhere all the year round in ever following generations. Wherever a small piece of forest has been spared, there this is one of the first *Rhopalocera* to be found. It is very fond of flowers, but is shy, and has a restless flight.

128. ATELLA SINHA, Kollar.

Snellen as *egista*. Hagen as *egista*. Grose Smith. Wallace. Distant. I have never seen *A. egista*, Cramer, which was described from Amboina, and recorded from Amboina, Bouru, Batchian, Morty, and New Guinea by Dr. A. R. Wallace. *A. sinha* is the rarest of the *Atellas* occurring in Sumatra, is found both in the plains and hills, has a very quick flight, and is not easily captured except when settled on a flower or on a moist spot on a forest road where it can be "potted" with the net.

129. ATELLA PHALANTHA, Drury.

Snellen. Hagen as *phalanta* [sic], Horsfield and Moore [sic]. Distant as *phalanta* [sic]. Occurs only at low elevations, often very near to the sea, frequents flowers, and is not easily caught from its shy restless habits and quick flight. It is very common throughout the year.

130. ATELLA ALCIPPE, Cramer.

Snellen. Hagen. Grose Smith as *aruana* [sic]. The *A. aruana* of Felder, from the Aru Isles (*Felder*), Mysol (*Wallace*), is a local race of *A. alcippe*. Found in Sumatra at higher elevations than the two foregoing species, even as high or higher than Bekantschan. Never seen in Deli, and never on black soil which is so favourable for tobacco, but as soon as there is red soil, as in Langkat and Serdang, one may be sure to meet *A. alcippe* on damp places in forest roads. It is very common near Selesseh.

131. CETHOSIA HYPISIA, Felder.

Snellen as *pentheseia* and *cyane*. Grose Smith as *hypsea*. Hagen as *cyane*. Wallace. The *C. penthesilea* of Cramer appears to be a distinct species, and occurs in Java. The *C. hypsea* of Doubleday and Hewitson is the Bornean form. *C. cyane*, Drury, is the Indian form.

132. CETHOSIA CAROLINÆ, Forbes.

C. carolinæ, Forbes, A Naturalist's Wanderings, p. 274 (1885).

A local race of *C. methypsea*, Butler, of the Malay Peninsula.

133. CETHOSIA LOGANI, Distant.

Hagen as *logani* and *biblis*. May perhaps be a local race of *C. biblis*, Drury, but in the Malay Peninsula both occur together. It may be noted that Dr. Hagen records both in one paper from Sumatra, so both may be found there also. *C. hypsina* and *C. logani* occur at low elevations, the latter even close to the sea—Dr. Martin once found many larvæ near the Saentis Estate only two miles distant from the sea—whereas *C. carolinæ* appears at the elevation of Bindjei, and from thence to the Central Plateau, those from high elevations being very richly coloured. All species of *Cethosia* are forest butterflies, frequenting both large and small jungle. The always sombre dark green forest is often made of a gayer aspect by the presence of these numerous, vivid, and gorgeously-coloured butterflies. Their flight resembles that of the *Danainæ* and is slow and sailing. The larvæ of *C. hypsina* and *C. logani* live on *Passiflora* sp., and eat not only the leaves but also the soft shoots of this creeper. The larva of *C. logani* is yellow with black longitudinal stripes, of *C. hypsina* of a very rich deep scarlet, broken only on the two median segments, which are creamy-white. Both larvæ have composite spines, they live in societies, and are always found in large numbers. On one occasion when Dr. Martin was collecting the larvæ of *C. hypsina* on a Passion-Flower with red fruit, he noticed the protective position assumed by some of the caterpillars which in eating a twig had surrounded it entirely, so that this bunch of larvæ even at a short distance looked like one of the fruits. In breeding a large number of *C. hypsina*, Dr. Martin noticed that the males emerged from the pupæ one day earlier than the females. None of the Sumatran species of *Cethosia* are dimorphic in the female, and none of them have dark females as have the species from India, Ceylon, and Nias.

134. TERINOS ATLITA, Fabricius.

Snellen. Grose Smith. Kirby. Hagen as *teuthras*, var. *delianus*,

so named, but not described, in Dr. O. Staudinger's sale list No. xxxiii (1889). Wallace as *viola*. Wallace described *T. viola* from Singapore and Sumatra, but pointed out that the male he described from Sumatra differed somewhat from his specimen from Singapore. The latter equals *T. teuthras*, Hewitson, *teste* Distant, the former *T. atlita*.

135. TERINOS CLARISSA, Boisduval.

Snellen as *larissa* [sic], Boisduval.

136. TERINOS TEOS, de Nicéville.

T. teos, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. viii, p. 41, n. 4, pl. K, figs. 5, male; 6, female (1893).

Grose Smith as *robertsia*. Snellen as *robertsii* [sic]. Hagen as *robertsia*, var. ? *sumatrana*, so named, but not described, in Dr. O. Staudinger's sale list No. xxxiii (1889) as var. *sumatrensis*. Wallace as *robertsia*, local form A. This species is a local race of *T. robertsia*, Butler, from the Malay Peninsula. Without knowing the habits of the species of the genus *Terinos*, one would know from their rich violet-blue coloration that one has to deal with true inhabitants of large forests, which never go to small jungle as the foregoing *Cethosiæ* often do. *T. clarissa*, Boisduval, is very rare, and no exact locality for it can be given except one specimen from Bekantschan, as all the specimens procured were brought in with numerous specimens of *T. teos*, de Nicéville, Dr. Martin not noticing the difference between these two species till I pointed it out to him. *T. atlita*, Fabricius, occurs more in the plains, but not at a lower elevation than Bindjei and Selesseh, but does not extend higher than Namoe Oekor. *T. teos*, de Nicéville, commences to appear at the same places and is found as high as Bekantschan and the lower hills. The butterflies are very restless, and fly round certain trees, on which they rest for a moment and then fly off again, so are not easy to catch, besides which they usually settle high up and fly high too. In November and December both the common species appear in large numbers, while in all the other months they are only procured singly, and are very worn, so Dr. Martin thinks that they may be only single brooded. At Namoe Oekor in October Dr. Martin and I caught only worn females, males being entirely absent, and in December of the same year the collectors brought in many males and a few fresh females from the same spot. Otherwise females are always rarer than the males, especially that sex of *T. atlita*. The female of *T. clarissa* is unknown to us from Sumatra. No Sumatran species of the genus shew the beautiful whitish-violet patch on the upperside of the hindwing found in *T. teuthras*, Hewitson, and *T. robertsia*, Butler, from the Malay Peninsula.

137. *CYNTHIA EROTOIDES*, de Nicéville, n. sp.

C. deione, Distant (*nec* Erichson), Rhop. Malay., p. 184, n. 1, pl. x, figs. 1, male; 2, female (1883).

Snellen as *arsinoë*. Hagen as *arsinoë*. Staudinger as *arsinoë*. Kirby as *arsinoë*. Distant as *deione*.

HABITAT: Malay Peninsula, N.-E. Sumatra, Borneo.

EXPANSE: ♂, 2·9 to 3·2; ♀, 3·7 to 4·0 inches.

DESCRIPTION: MALE. UPPERSIDE, *both wings* differ from *C. erota*, Fabricius, from the Eastern Himalayas, Bhutan, Assam, Burma, and Java in their darker ground-colour. *Forewing* differs in the apex being widely and the outer margin decreasingly infuscated. Otherwise as in that species. FEMALE. UPPERSIDE, *hindwing* differs only in having the inner of the two submarginal fuscous lines straighter—less lunulated—and continuous. Otherwise as in that species.

Cramer described *C. arsinoë* from Amboina and the west coast of Sumatra, but apparently figured it (a male) from the former locality, my specimens from Saparua in the Moluccas and from New Guinea agreeing fairly well with Cramer's figure. *C. dejone*, Erichson, was described from Luçon in the Philippines, the female being figured. In the male of this species the apex of the forewing on the upper-side is not infuscated, and in the female the ocelli of the hindwing on the upperside differ in being almost entirely ochreous, with a very small instead of a large black centre. *C. cantori*, Distant, described from a unique specimen from Province Wellesley, is probably a "sport." The males of *C. erotoides* are common everywhere in Sumatra, and are found all the year round on forest roads, where they are fond of moist spots, to which they will always return even after an attempt is made to catch them. The females are as rare as the males are common, and are only found in the forest. The males have a strong short flight, somewhat like that of a *Charaxes*, whereas the females fly more slowly and sail more. The species is found only as high as Bekantschan.

138. *CYNTHIA BATTAKA*, Martin.

C. battaka, Martin, Nat. Tijd. voor Neder.-Indië, vol. liii, p. 338, n. 3 (1893).

This species may typically be known from *C. erotoides*, de Nicéville, by its smaller size, darker ground-colour of the upperside, the apex of the forewing especially being much more infuscated, the basal area of both wings on the underside is of a deeper red, and the subapical spot in the upper discoidal interspace of the forewing is always silvery-white, while in *E. erotoides* it is either totally wanting, or, if present, is small and fuscous; the tail to the hindwing is also shorter. From Bekantschan to the higher hills and the Central Plateau *C. battaka* alone

occurs, and it has the same habits as *C. erotoides*. As Dr. Martin never obtained the latter species from places higher than Bekantschan, and never true *C. battaka* from places lower than Bekantschan, and as both species occur quite at the same time, there can be no question here of seasonal dimorphism. Dr. Martin notes that he is quite sure *C. battaka* is a good species restricted to the mountainous regions of our area. He notes also that he has received some specimens of *C. battaka* from Java, but without exact locality, and hopes to hear later at what elevation they were obtained, as *C. erotoides* occurs also in that island. Dr. Martin further notes that he obtained one female of *C. battaka*, which differs greatly from the female of the former species, these differences are pointed out in his original description of *C. battaka* (l. c.).

139. *APATURA NAMOUNA*, Doubleday.

Hitherto this species has not been recorded south of Upper Burma, its re-appearance in Sumatra is most interesting. In our area it is a very rare butterfly, and is found only on the higher hills at an elevation of not less than 3,000 feet, and from the Central Plateau and the Gayoe mountains. The specimens from Sumatra are decidedly smaller than those from Northern India, but do not otherwise differ. No female from Sumatra has been obtained.

140. **APATURA PARVATA*, Moore.

Grose Smith. This is almost certainly a wrong identification, *A. parvata* being restricted to Sikkim and Bhutan. The specimen Mr. Grose Smith obtained was probably a female of the next species.

141. *APATURA (Rohana) SUMATRENSIS*, Staudinger.

A. (Rohana) parisatis, Westwood, var. *sumatrensis*, Staudinger, *Iris*, vol. ii, p. 80 (1889).

A. parisatis, Snellen (*nec* Westwood), *Midden-Sumatra*, *Lepidoptera*, p. 19, n. 1, pl. iii, figs. 1, male; 2, male underside $\times 2$ (1892).

Snellen as *parisatis*. Hagen as *parisatis*. Staudinger as *parisatis*, and *parisatis*, var. *sumatrensis*. Semper as *camiba*. The male may be known from the N.-E. Indian and Burmese species, *A. parysatis*, Westwood, by having a small diffused apical ferruginous patch on the upperside of the forewing, which is absent from the continental species. The females of the two species differ but slightly. Like *Atella alcippe*, Cramer, this insect only appears on red soil (probably the food-plant of the larva grows only on that soil), where the males from Selesseh to the higher hills are not rare, whereas the females are always scarce,

or apparently so, as they are excellent mimics of species of *Ergolis*, and are doubtless often passed over as such by the collectors. The males like to go to small muddy or swampy spots on the roads, where they are easily "potted" with a net. The females are never seen on the roads, but fly like *Ergolis* through the jungle. The male of this butterfly does not exhibit any very gorgeous coloration, but nevertheless it has a beauty of its own owing to the deep velvety-black colour of the upperside, which is so exceedingly delicate and so like the bloom on a peach that one never sees an absolutely perfect specimen in a collection. It is especially common on roads cut through the red hills on the banks of the Whampoe river, also in Serdang and Padang Bedagei.

142. *APATURA (Rohana) ARTAXES*, de Nicéville.

A. (Rohana) artaxes, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 261, n. 3, pl. N, figs. 3, male; 4, female (1895).^{*}

This species is restricted to the Central Plateau, from whence Dr. Martin obtained his first female specimens in October and December, 1893. As the males are very similar to the same sex of the foregoing species, they escape the nets of the Battak collectors, and Dr. Martin only obtained two in thirteen years. Many more females than males have been obtained. It would be interesting to know if the female is a mimicker, and if so, what species is mimicked.

143. *EULACURA OSTERIA*, Westwood.

Staudinger. Rare in Sumatra, and occurs only at Selesseh and Namoe Oekor in July. The female is rather rarer than the male. Both sexes settle on the underside of leaves with wide-spread wings, and never fly long distances. It is a common butterfly in the Botanical Gardens at Singapore.

144. *HESTINA NAMA*, Doubleday.

Hagen as *nama*, Boisduval [sic]. Staudinger. Occurs in Perak in the Malay Peninsula.

145. *HESTINA CAROLINÆ*, Snellen.

H. carolinæ, Snellen, Tijds. voor Ent., vol. xxxiii, p. 218 (1890); idem, id., l.c., vol. xxxvii, p. 67 (1890).

Snellen. Both species of *Hestina* occur in our area only in the hills and on the Central Plateau, the lowest elevation at which they are found (except one male of *H. carolinæ* which Dr. Martin caught near the iron bridge over the Bindjei river at Namoe Oekor) being Bekantschan. *H. carolinæ* flies in May. *H. nama* doubtless mimics *Danaïs*

tytioides, de Nicéville, while *H. carolinæ* mimics *Danaïs banksii*, Moore. So long as these *Hestinas* think themselves safe and unobserved their flight closely resembles that of the *Danainæ*, but as soon as they scent danger they assume their proper rapid mode of flight, which is like that of the males of species of *Hypolimnæ*s. So far females of *H. carolinæ* have only been obtained, that sex of *H. nama* not having been captured in our area. The two species are undoubtedly distinct, the differences between them being well pointed out by Heer P. C. T. Snellen. They are very much rarer than is *H. nama* in the Himalayas.

146. *HERONA SUMATRANA*, Moore.

H. sumatrana, Moore, Trans. Ent. Soc. Lond., 1881, p. 308; id., de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 5, n. 4, pl. iii, fig. 7, *female* (1894).

Moore. Grose Smith. Originally described from Sumatra. As also in all other localities the Sumatran species of *Herona* is very rare. In Deli it occurs from Selessch to Bekantschan in March, July and September, but only four or five specimens a year will be obtained by all our collectors put together. On the wing it looks like an *Euthalia* and has a similar flight, though it has the habit of settling on tree trunks which *Euthalias* seldom or never do except when sucking up the juice from a wound in the bark.

147. *PRECIS IPHITA*, Cramer.

Snellen. Hagen.

148. *PRECIS IDA*, Cramer.

Hagen. Semper. Both species of *Precis* are found throughout our area and all the year round in ever following generations. *P. iphita*, Cramer, is somewhat the rarer, and is restricted to forests both large and small, whereas *P. ida* is found more in open ground, mostly near houses, in gardens, and in orchards, but never in forest. There are no intermediate gradations between these two species in Deli. They have a stronger and bolder flight than the species of *Junonia* which follow.

149. *JUNONIA ALMANA*, Linnæus.

Snellen as *asterie*. Grose Smith as *asterie*. Hagen as *asterie*. Distant as *asterie*. In my opinion *J. almana* and *J. asterie*, both of Linnæus, are one and the same species, the former being the dry-season non-ocellated, the latter the wet-season ocellated form. Only the latter is found in Sumatra, which accounts for that name being used by all authors in recording it from the island. As, however, *almana* is the older name for the species, it has to be used, though it was

applied to the dry-season form. It is common in Sumatra on open grassy places, near houses and ditches, but is never found in the forest. Dr. Martin once found the larva on a small, low, white-flowering, labiate plant.

150. JUNONIA ATLITES, Linnæus.

Snellen as *laomedia*. Hagen as *laomedia*. Distant. Quite as common in Deli as the preceding species, and found from close to the sea to the Central Plateau, specimens from the hills being richer in colour with blacker margins than those from the plains. It is very fond of water, near which, if it is running in open places or in ditches, it may always be found.

151. *JUNONIA VELLIDA, Fabricius.

Grose Smith. Kirby. This species occurs only in Australia, as far as I am able to ascertain. Its record from Sumatra by the authors cited is probably erroneous.

152. JUNONIA OCYALE, Hübner.

Snellen as *orythia* [sic] and *orithyia*. Hagen as *orithya* [sic]. Semper. Staudinger as *wallacei*. *J. ocyale* is a local race of *J. orithyia*, Linnæus, a very widely spread and variable species. I agree with Herr Georg Semper (Schmett. Philipp., p. 120, n. 142) that *J. wallacei*, Distant, described from the Malay Peninsula and Java, is a synonym of *J. ocyale*. Mr. Distant does not venture to say how the two species are supposed to differ. Even in a restricted area like Sumatra this butterfly shows variations within certain limits, and is more pronounced in the female than in the male. It is found over the whole of our area, but not too near the sea; it is very fond of small grassy spots, where it often abounds, and where also the rarer female may be captured. It is very restless, often settling, but only remaining for a very short time when it again takes a short quick flight, so that it is not easily caught. Dr. Hagen reports seeing it in large numbers in the short degenerated lalang-grass of the Central Plateau.

153. NEPTIS (*Rahinda*) HORDONIA, Stoll.

Grose Smith as *hordona* [sic]. Hagen. Distant.

154. NEPTIS (*Rahinda*) PARAKA, Butler.

Grose Smith as *peraka* [sic]. Hagen as *peraka* [sic]. Standinger as *peraka* [sic]. Dr. Staudinger considers the *N. dahana*, Kheil, from Nias island, to be a synonym of this species.

155. NEPTIS TIGA, Moore.

Butler. Staudinger as *tiga* and *dorelia*. I have a very long suite of specimens of this species, and after careful comparison have come to the conclusion that *N. dorelia*, Butler (1877), *N. sattanga*, Moore (1881), and *N. kuhasa*, de Nicéville (1886), are all synonyms of *N. tiga*, Moore (1858). To this list will probably have to be added *Rahinda* [sic] *siaka*, Moore, Trans. Ent. Soc. Lond., 1881, p. 311, described from Sumatra, as the description agrees exactly with some specimens of *N. tiga* I possess from Perak in the Malay Peninsula and Sumatra. The variation observable in *N. tiga* is obviously mainly due to season, the dry-season form being sparsely banded with black on the underside, the wet-season form heavily so. Of the three small yellow *Neptes*, *N. hordonia* is the commonest, whereas *N. paraka* and *N. tiga* are both rare, especially the latter. They all occur in large and high forest, but are most frequently found on the boundaries of the forest, or just within the borders, where there is considerable sunshine. They are very weak-flying insects, and are easily captured when at rest with wide spread wings on the leaves of low bushes and on flowers. *N. hordonia* occurs in the plains up to Bekantschan, the other two prefer higher elevations, and have been caught as high as Soengei Batoe.

156. NEPTIS BATARA, Moore.

N. batara, Moore, Trans. Ent. Soc. Lond., 1881, p. 310.

Moore. Snellen as *miah*. Originally described from Sumatra. *N. batara* has been described and figured by Distant in Rhop. Malay., p. 444, n. 13, pl. xli, fig. 14 (1886), as *N. miah*, var., from Perak. It is very doubtfully distinct from *N. miah*, Moore. Found only on the higher hills at Soengei Batoe and the Central Plateau in July, but is very rare.

157. NEPTIS SANKARA, Kollar.

Excessively rare, Dr. Martin obtained a single male from the Battak mountains in October, 1894. It is more intensely black and white than typical *N. sankara*, but the markings are similar. The *N. amba* and *N. carticoides*, both of Moore, are synonyms of this species, as probably also is *N. amboides*, Moore.

158. NEPTIS THAMALA, Moore.

N. thamala, Moore, Journ. Linn. Soc. Lond., Zoology, vol. xxi, p. 36, pl. iii, fig. 1, female (1886).

Originally described from Lower Burma. It is very rare in Sumatra,

Dr. Martin has obtained three or four specimens only, one of which from Namoe Oekor is in my collection, taken in October.

159. NEPTIS VIKASI, Horsfield.

Hagen as *vikasi*, Moore [sic]. Butler. Staudinger. A common species in the plains, but restricted to forest.

160. *NEPTIS OMERODA, Moore.

N. omeroda, Moore, Proc. Zool. Soc. Lond., 1874, p. 571.

Grose Smith as *ormeroda* [sic]. Originally described from Penang in the Malay Peninsula. Mr. Distant considers it to be a synonym of *N. vikasi*, Horsfield. Mr. Moore describes it as being "a much blacker insect both above and below" than that species. It is unknown to us.

161. *NEPTIS HARITA, Moore.

Staudinger. It is quite probable that this species does occur in Sumatra, though Dr. Martin has never obtained it. Though quite distinct it may easily be overlooked, as it is very similar to *N. vikasi*, Horsfield.

162. NEPTIS ANJANA, Moore.

Is by far the most beautiful *Neptis* of our area, especially the underside of both wings, which exhibit very splendid colours. Is found only in the hills as high or even higher than the Central Plateau, 3,000 feet. Dr. Martin possesses three specimens only, the first obtained in 1894, after twelve years' collecting.

163. NEPTIS LEUCOTHÖE, Cramer.

Snellen as *aceris*. Hagen as *aceris*. Certainly the commonest species of the genus in Sumatra, and found almost everywhere all the year round. *N. aceris*, Lepechin, of Europe, appears to me to be distinct from the present species, as it has the white bands on the underside of both wings not outwardly defined with black as they invariably are in both the wet- and dry-season forms of *N. leucothöe*—the latter form not found in Sumatra.

164. *NEPTIS PAPAJA, Moore.

N. papaja, Moore, Proc. Zool. Soc. Lond., 1874, p. 570.

Moore. Kirby. The description of this species agrees with specimens I have identified as *N. leucothöe*, Cramer, the ground-colour of the underside being "ferruginous-yellow; markings prominent, black-

bordered." It was described from Sumatra. This adds one more to the twelve synonyms of *N. leucothoë* given by me in "The Gazetteer of Sikkim," p. 137 (1894).

165. *NEPTIS NATA*, Moore.

Grose Smith. Hagen. A common species in the plains. It is a little variable, in typical specimens the discal white band on the under-side of the hindwing ends on the costal nervure, in others it ends on the first subcostal nervule. I greatly doubt if the *N. gononata*, Butler, from Malacca, is distinct from this species.

166. *NEPTIS DURYODANA*, Moore.

Grose Smith as *duryodama* [sic]. Snellen. A common species of the plains in October.

167. **NEPTIS NADINA*, Moore.

Grose Smith as *soma*. *N. soma*, Moore, is a synonym of *N. nadina*, Moore. It is probable that Mr. Grose Smith identified this species from specimens similar to those which I subsequently described as *N. clinioides*.

168. *NEPTIS CLINIOIDES*, de Nicéville.

N. clinioides, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 6, n. 5, pl. i, fig. 8, male (1894).

Very rare, a few specimens only have been obtained in the Battak mountains and Central Plateau in June.

169. *NEPTIS SUSRUTA*, Moore.

Grose Smith. A common species in the low forests.

170. **NEPTIS HELIODORA*, Cramer.

Hagen. Probably a wrong identification. It was described from Amboina, and is apparently confined to the Moluccas.

171. *NEPTIS OPHIANA*, Moore.

Hagen as *ophiana*, var.? Very rare, Dr. Martin has obtained a single specimen. Herr Georg Semper places this species and its allies in the genus *Phædyma*, Felder, of which *N. heliodora*, Cramer, is the type (Schmett. Philipp., p. 142 (1889). With the exception of *N. sankara*, Kollar, *N. clinioides*, de Nicéville, and *N. ophiana*, Moore, all the black species of *Neptis* are common insects, occurring everywhere in open places, both in small jungle and in large forest, except *N. susruta*,

Moore, and *N. nata*, Moore, which are restricted to the latter. Of the *Nymphaliniæ* the species of this genus are earliest on the wing, and do not appear at all to mind the leaves being wetted with rain or dew. After a shower they will appear immediately, and even fly when there is no sun. Wherever there are a few trees or bushes along the roads, in gardens, and in fact practically everywhere they may be found, weakly sailing about and frequently settling; apparently highly protected as they shew no fear whatever.

172. *CIRRHOCHROA ORISSA*, Felder.

Grose Smith. Hagen. In the male on the upperside of the forewing the first median nervule and submedian nervure, and the subcostal nervules of the hindwing are for some distance on both sides defined by a fine ochreous line, the veins themselves being black. Occurs only in forest, but not at high elevations, not higher than Namoe Oekor; very common at Selesseh in June and August.

173. *CIRRHOCHROA SATELLITA*, Butler.

Hagen. The male has no secondary sexual characters. It is rarer than *C. orissa*, Felder; occurs only in forests, and at still lower elevations in July. It is weaker on the wing than that species.

174. *CIRRHOCHROA CLAGIA*, Godart.

Snellen. Distant. In the male on the upperside of both wings the veins where they cross the disc are more or less black, and in the forewing they are defined on both sides with ochreous for a short distance on entering the broad black marginal border. Occurs only at elevations over 1,000 feet, higher than Namoe Oekor, found at Bekantschan and Soengei Batoe in May, July, and September. Is the rarest of all the species of *Cirrhochroa* occurring in Sumatra.

175. *CIRRHOCHROA BAJADETA*, Moore.

Snellen. Hagen. The male has no secondary sexual characters. Is found everywhere in October in forest, and also in places where a small piece of the original forest has been left, as does *Cupha erymanthis*, Drury. The males are prone to visit damp spots on roads.

176. *CIRRHOCHROA MALAYA*, Felder.

Hagen. Wallace. Mr. Distant remarks that "Specimens will be obtained of a completely intermediate character between *C. bajadeta* and *C. malaya*." I have seen none such in Sumatra, in fact, *C. malaya* appears to me more nearly allied to *C. mithila*, Moore, than to

C. bajadeta, the male differing from that sex of the former on the upperside of the forewing in having a broad black marginal border instead of three waved black lines, and in the hindwing in having the inner of the three marginal black lines discontinuous instead of continuous. The secondary sexual characters of the male consists in some specimens (absent in others) of the fifth subcostal and upper discoidal nervules of the forewing on the upperside on entering the apical black margin being defined on both sides by a narrow line of ochreous. It is much rarer than *C. bajadeta*, and occurs in the same localities, but is not found higher than Namoe Oekor. The female is unknown to us.

177. CIRRHOCROA MITHILA, Moore.

Hagen as *aoris*. *C. aoris*, Doubleday and Hewitson, is confined to the Eastern Himalayas, Assam, and Upper Burma, Dr. Hagen's identification probably applies to the present species. It is somewhat rare, and found in forests at low elevations. The male has no secondary sexual characters.

178. CIRRHOCROA (*Paduca*) FASCIATA, Felder.

Wallace. Staudinger. Kirby. Semper. I have fully described the male secondary sexual characters of this species in Butt. of India, vol. ii, p. 109. It is the smallest and weakest-flying species in the genus, inhabits forest, and is always somewhat rare. It is found from near the sea to the mountains as high as Bekantschan. In 1890 Dr. Martin found it unusually plentiful at the Saentis Estate near the sea, where a flowering tree was daily covered, so long as the flowers lasted, with this species, and on two occasions he captured more than forty quite fresh specimens.

179. STIBOCHIONA KANNEGIETERI, Fruhstorfer.

S. kannegieteri, Fruhstorfer, Ent. Nach., vol. xx, p. 305 (1894).

Snellen as *coresia*. Grose Smith as *coresia*. Hagen as *coresia*. Staudinger as *coresia*. Kirby as *coresia*. Originally described from Sumatra and Borneo. Very near to *S. coresia*, Hübner, from Java, (from whence also Herr H. Fruhstorfer has described *S. rothschildi*), that species in the male on the upperside of the hindwing having a series of submarginal white spots which are absent in the Sumatran species, and in the female having a broad white marginal band which in the Sumatran species is replaced by a series of white spots similar to the male of *S. coresia*. Occurs in our area from the lower hills to the Central Plateau, is not common, and is seldom procured in perfect condition. The lowest localities where Dr. Martin has caught it are Namoe Oekor

in Langkat, and Kotta Lembaroe in Deli. It settles on trees not very high from the ground with widespread wings, and behaves on the wing like an *Euthalia*.

180. *HYPOLIMNAS BOLINA*, Linnæus.

Snellen. Hagen as *bolina* and *jacintha*. Wallace. Staudinger as *bolina*, var. *jacintha*. Distant. Extremely variable in the female sex, many of them being of the form named *jacintha* by Drury. But none of the forms described by Cramer from Java which are more or less richly marked with ochreous on the upperside, such as *iphigenia*, *melita*, *alcmena*, *antigone*, and *proserpina* are found in Sumatra. In Deli it is rather rare, and prefers low elevations, not being found higher than Namoe Oekor. It is more plentiful near the sea, as at the Saentis Estate and at Mabar Dr. Martin could obtain one or two specimens nearly every day. Only in December, 1892, and January, 1893, it appeared in large numbers and all varieties of the female near Bindjei, but in the following year there was not a single specimen to be seen. It does not frequent forests, but is found on roads, in gardens, and near houses.

181. *HYPOLIMNAS ANOMALA*, Wallace.

Grose Smith. Snellen as *antelope*. Hagen. Semper. The *H. antelope* of Cramer described from Amboina appears to be a distinct species, and is recorded by Wallace from Amboyna, Ceram, and Bouru. In our area *H. anomala* becomes year by year more scarce, in correlation with the disappearance of the forests. It does not occur at higher elevations than Bindjei. Is a highly mimetic insect, as the males very closely resemble on the wing the brown species of *Euploea*, such as *E. moorei*, Butler, and also settle near forest roads like *Euploea*s with *folded* wings. The female is trimorphic; the first form has the upperside richly glossed with blue, and mimics the male of *Euploea linnæi*, Moore; the second form is dull brown, lacking the blue coloration altogether, is very similar to the male, only duller and larger, and mimics the brown *Euploea*s; the third form has along the outer margin of the hindwing on both the upper and undersides a series of marginal white streaks between the veins, and may be taken on the wing for *E. pinwillii*, Butler.

182. *HYPOLIMNAS MISIPPUS*, Linnæus.

Snellen. Hagen. Distant. The female in Sumatra is of the form of *diocippus*, Cramer, and is a beautiful mimic of *Danais chrysippus*, Linnæus. The form which mimics *Danais klugii*, Butler, and occurs in India and Africa, is not found in Sumatra, neither does it

mimic the white aberration of *D. chrysippus*, (*alcippus*, Cramer), which is found in Sumatra, as it does in Africa. *H. misippus* is very common in Sumatra, and abounds in open places, on roads, near houses, and especially in newly-cut tobacco fields, where after the tobacco is cut down and removed there springs up a rich growth of low plants. Not found at a greater elevation than Bekantschan. Has a wide range, from Northern Australia and New Guinea on the one hand, to Florida in the United States of America on the other. Dr. Martin notes that not knowing the species in Europe and on first arrival in Sumatra he would not believe his European assistant when he brought both sexes and said they were male and female of one species. Dr. Martin dismissed him with an incredulous smile, but the next day he caught a couple paired, and then knew better.

183. ARGYNNIS NIPHE, Linnæus.

Snellen. Grose Smith. Hagen. Staudinger. Semper. Occurs only on the Central Plateau, where in some years it is found in large numbers and where Dr. Hagen captured it. Dr. Martin caught a single male specimen at Toentoengan in Deli in September, 1888, to which place this mountaineer may have been carried by a high wind. Sumatran specimens are never as large as those from Northern India, but are usually larger than the Javan form (*A. javanica*, Oberthür), which has a richer and darker coloration than the Sumatran form. The female is rarer than the male, native collectors bring it in the proportion of one to five. (For notes on this species see de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. viii, p. 153 (1893).

184. DICHORRHAGIA NESIMACHUS, Boisduval.

Hagen. Semper. Formerly by no means a rare insect in Deli and Langhat before the clearing of the forest, and occurred at low elevations, not higher than Bekantschan. Dr. Hagen before 1882 found it common in Serdang, whereas Dr. Martin, who commenced to collect in that year, obtained his first specimen in 1887 near a small river at Soengei Beras, where a small piece of forest was left. Later it was found to be more plentiful at Selesseh, also south of Namoe Oekor, and in Padang Bedagei; the Gayoe collectors again brought it in large numbers, collected in the forests on the way to their homes in the mountains. It is fond of settling on forest roads with wings only half open, and has a very rapid flight as its robust structure shews.

185. PARTHENOS GAMBRISIUS, Fabricius.

Hagen. Wallace. All the species of this genus have a very beautiful and characteristic flight, unlike any other butterfly known to me.

It is very strong on the wing, and flies over high bushes and trees, and alights on the uppersides of the leaves with open wide-spread wings. When flying it keeps the wings very level and parallel with the ground, the tips or apices of the forewings slightly depressed, it flaps the wings but seldom, and is much given to soaring. The Sumatran form is the one which has been named *P. lilacinus* by Butler, and has a patch on the internal area of the forewing and the basal area of the hindwing on the upperside marked with lilac. In our area it occurs all the year round at low elevations, not as high as Namoe Oekor, is not rare, but is not easy to capture. Is found not only in high forest, but also in small strips of forest and jungle always accompanying the smaller streams. Is very fond of and is only found near water. In a boat journey up the Bedagei River, both banks of which were covered with the flowers of a snow-white lily, Dr. Martin noticed *P. gambrisius* settling in considerable numbers on the flowers; a beautiful sight for a lover of nature. At the Batoe Mandi Estate on the high bank of the Wampoe River are planted a few male papaya trees (which of course bear only flowers and no fruit), and on these flowers the Javan collector Saki captured a very fine series of specimens.

186. *LEBADEA MARTHA*, Fabricius.

Limenitis martha, Butler, Cat. Fab. Lep. B. M., p. 59, n. 1, pl. i, fig. 4, male (1869).

Lebadea alankara, Horsfield (*martha*, Fabricius?), var. *sumatrensis*, Staudinger, Ex. Schmett., p. 142 (1886).

Hagen. Butler as *alankara* and *martha*. Kirby. Distant. Staudinger as *alankara*, var. *sumatrensis*, and *martha*, var. *sumatrensis*. Fabricius described this species from Siam; Butler says the type is in the Banksian collection at the British Museum, he figures the species, and records it from Sumatra. Not having any Siamese specimens of *Lebadea* to compare with Sumatran ones, I accept Butler's identification; but should the Siamese and Sumatran species be found afterwards to differ, Staudinger's name *sumatrensis* must stand. The genus is a small one, and contains *L. ismene*, Doubleday and Hewitson, from Sikkim, Bhutan, Assam, and Upper Burma, which gradually merges into *L. attenuata*, Moore, from Lower Burma, which again meets *L. martha*, Fabricius = *L. alankara*, Horsfield, in the Malay Peninsula, found also in Sumatra, Java and Banca; another species being *L. paduka* (nec *L. panduka*, Staudinger), Moore, from Borneo. Butler in Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 565 (1877) gives both *L. alankara* and *L. martha* from Sumatra, it is hardly probable that two distinct species occur in one island, and, as will be seen above, I consider those two names to represent one species. In our area it occurs from

Selesseh to Namoe Oekor, and as high as Soengei Batoe; is a true butterfly of the forest, settles on leaves with spread wings, and has a decidedly weaker flight than *Limenitis* and *Euthalia*. The sexes differ very much in size, the female being always much larger than the male; often extremely small males are found. It is not a common butterfly.

187. *LIMENITIS ALBOMARGINATA*, Weymer.

L. albomarginata, Weymer, Stet. Ent. Zeit., vol. xlviii, p. 5, n. 3, pl. ii, fig. 2, male (1887).

L. albomarginata, Martin, Einige neue Tagschmetterlinge von Nordost-Sumatra, pt. 2, p. 7, n. 7 (1895).

L. hageni, Staudinger, Iris, vol. v, p. 452 (1892); idem, id., l.c., vol. vii, p. 342 (1894).

Padang, West Sumatra, Weymer. Staudinger. This species is a very distinct local race of the Himalayan and Assamese *L. danava*, Moore. It occurs only in Sumatra, and in our area is found only on the Central Plateau, from whence every year a large number of males were brought by the collectors, once only a single female, which Dr. Martin has described (l. c.). As the sexes of this as well as of other butterflies are produced in about equal numbers, it shews clearly the skulking habits of the female that it should be so excessively rare in collections. The same sex of *L. danava* is almost equally rarely seen in India.

188. *LIMENITIS DARAXA*, Doubleday and Hewitson.

Doherty records this species from Larut Hill, Perak, Malay Peninsula, and describes *L. agneya* from the same hill, but found at 3,000 feet lower elevation (Journ. A. S. B., vol. lx, pt. 2, p. 176 (1891). *L. daraxa* is much rarer in our area than the preceding species, and occurs in the same locality. Never more than two or three specimens are captured in one year.

189. *LIMENITIS BOCKII*, Moore.

L. bockii, Moore, Trans. Ent. Soc. Lond., 1881, p. 308.

Moore. Hagen as *dudu*. Grose Smith as *dudu* and *bockii*. Moore describes this species from Sumatra, and as allied to *L. dudu*, Westwood, from North-Eastern India, differing in being smaller, with a broader transverse white band. The size is unimportant, I possess smaller specimens of *L. dudu* than of *L. bockii*; but the discal band is certainly broader, especially so on the forewing. The rarest of all the species of *Limenitis* in our area, of which Dr. Martin has received during all the period he was in Sumatra not more than ten specimens, nearly all of

which were captured near Kampong Naman and Kampong Beras Tepoe on the Central Plateau. Mr. Grose Smith's record of both *L. dudu* and *L. bockii* from Sumatra is almost certainly incorrect.

190. LIMENITIS (*Moduza*) PROCRIS, Cramer.

Hagen. Distant. A common species everywhere, but not found higher than Bekantschan, as the food-plant of the larva does not grow at the higher elevations. The butterfly is fond of wet places and fæces on roads, to which it always returns after being disturbed. If pursued it retires for a short time into the jungle, and settles on the leaves. It is never met with in large forest.

191. PANDITA SINOPE, Moore.

Hagen. Is now very rare in Deli at low elevations, occurs in Dr. Martin's fruit garden at Bindjei and at Selesseh, but never at a higher elevation. In the time before so much of the forest had been destroyed for tobacco cultivation in Deli it was more common, and always shewed a preference for small forest or the boundaries of large forest, seldom found within the precincts of the latter.

192. ATHYMA PERIUS, Linnæus.

Hagen as *perius*, Aurivillius [sic]. Snellen as *leucothoë*. Common everywhere from near the sea and extending to the Central Plateau. This species also was very plentiful before the advent of the tobacco cultivation, but is now somewhat rare in those districts. As soon as these are left behind it appears everywhere on roads and the margins of small forest. It is doubtless a good mimic of our commonest species of *Neptis*, *N. leucothoë*, Cramer, together with which it is always found, and from which it is not easily differentiated on the wing, but, if pursued, it at once assumes its stronger and bolder proper *Athyma*-like flight. Occurs also at Asahan and in the Gayoe-lands.

193. ATHYMA LARYMNA, Doubleday and Hewitson.

Grose Smith. Snellen. The largest of all our *Athymas*, occurs all over our area with the exception perhaps of the Central Plateau. Is decidedly rare, and always found only singly on fæces and moist spots on forest roads. Every year Dr. Martin captured two or three specimens on the muddy banks of the Soengei Diski River near Paya Bakong.

194. ATHYMA IDITA, Moore.

Grose Smith. Has the same range and occurs in similar places

as *A. larymna*, Doubleday and Hewitson, but is very rare. In consequence of the beautiful coloration and markings of the underside it is a conspicuous insect when at rest with folded wings.

195. *ATHYMA KANWA*, Moore.

Snellen. Very rare, more so than the two foregoing species. Found from Bekantschan to Soengei Batoe. Dr. Martin has never seen it on the wing.

196. *ATHYMA PRAVARA*, Moore.

Butler. Distant. A commoner species than those mentioned above. Occurs in forests in the plains and as high as Namoe Oekor. It is the smallest of our *Athymas*, and is easy to recognise by the club-like streak with rounded end in the discoidal cell of the forewing.

197. *ATHYMA RETA*, Moore.

Moore as *reta* and *kresna*. Grose Smith as *reta* and *kresna*. Hagen as *reta*, var. ? Kirby. Distant as *kresna*. Butler as *kresna*. Moore described both *A. reta* and *A. kresna* from Sumatra on the same page and figured both. He figures *reta* with all the spots and bands of the upperside pure white; *A. kresna* with all the markings pale blue except the submarginal band of the hindwing which is white. The markings are precisely similar except that in *A. reta* they are somewhat larger. I have no hesitation whatever in considering these two supposed distinct species to be one and the same, the differential characters given to distinguish them being in my opinion quite non-specific, being based on characters which are obviously variable. The blue coloration of *A. kresna* is almost certainly incorrect. In one place Mr. Moore speaks of the markings as "bluish-white," and in another as "white." It is a common species in Borneo, and occurs also in Lower Burma and the Malay Peninsula. Mr. Moore has suggested that *A. subrata*, Moore, may be a dimorphic form of the female of *A. kresna* = *A. reta*, the ordinary female of which has reddish markings. I possess only males of *A. kresna*, so have no idea what its female is like. *A. subrata* is quite distinct from *A. kresna*, see No. 199, that species being a local race of *A. nefte*, Cramer; *A. subrata* cannot therefore be the female of *A. kresna*. Together with *A. perius*, Linnæus, and *A. subrata*, Moore, this is the commonest species of the plains, and is met with on nearly every road leading through high forest. The pupa is very richly decorated with gold as usual in the genus.

198. *ATHYMA ABIASA*, Moore.

Grose Smith. This rare and beautiful species occurs at Soengei

Batoe, 3,000 feet, and even higher. It is easily recognised by the fine white lines before and beyond the large white spot at the end of the discoidal cell of the forewing.

199. *ATHYMA AMHARA*, Druce.

Limenitis selenophora, Snellen (*nec* Kollar), Midden-Sumatra, Lepidoptera, p. 15, n. 1, pl. i, figs. 4, 5, *male* (1892).

Snellen as *selenophora*. Is a local race of *A. selenophora*, Kollar, that species occurring in the Himalayas, Bhutan, Assam, Tavoy in Burma, and Java. The present species is found in the Malay Peninsula, Sumatra, and Borneo. The male differs only from *A. selenophora* in having a submarginal or outer-discal pure white macular instead of a very obscure pale fuscous fascia on the upperside of the hind-wing. The females of the two species are indistinguishable. It is the commonest species of *Athyma* of the higher mountains and the Central Plateau, especially plentiful in December and January; found also in Indragiri.

200. *ATHYMA SUBRATA*, Moore.

Grose Smith as *subrata* and *nefte*. Hagen as *nefte*. Staudinger as *nefte*. Distant. We have here to do with a very interesting group of species. In Sikhim, Bhutan, Assam and South India the male is much marked on the upperside with yellow, and is the *A. inara* of Doubleday and Hewitson (= *inarina*, Butler). This species gradually merges in Burma into *A. asita*, Moore, specimens absolutely intermediate between *A. asita* and *A. inara* occurring. Further south in the Malay Peninsula, Sumatra, Nias, and Borneo *A. subrata* (= *nivifera*, Butler), occurs. The characters given by Butler to distinguish it from *A. nefte*, Cramer, hold good, so it may be accepted as a good local race. In Java *A. nefte* alone occurs. *A. rufula*, de Nicéville, from the Andaman Isles, and *A. glora*, Kheil, from Nias, are distinct species. *A. inara* and *A. asita* have one female only, which is yellow. *A. subrata* has two females, the one is yellow, the other is brown. It was described from the brown form of female, its male is the *A. nivifera* of Butler. *A. nefte* is also dimorphic, one form being yellow the other brown. The two females of *A. subrata* and the two of *A. nefte* cannot be distinguished, the males alone are different, and the species are kept distinct by me on the male sex alone. *A. rufula* appears to have only one form of female. As noted above, this is a common species of the plains, not occurring higher than Namoe Oekor. The males are found on forest roads, the females inside the forest, of which latter the brown form is less rare than the yellow. The brown form almost certainly mimics *Neptis vikasi*, Horsfield, but there is no large yellow *Neptis* in our area that the

yellow form could mimic, though, as Doherty has remarked, size is probably not an insuperable bar to mimicry, as the vertebrate enemies of insects probably think that insects in the perfect state grow as they do themselves, so that our large yellow female *Athyma* probably does mimic the smaller yellow species of *Neptis*, such as *N. hordonia*, Stoll.

201. *ATHYMA ASSA*, de Nicéville.

A. assa, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. viii, p. 42, n. 5, pl. K, fig. 8, male (1893).

Occurs at the same localities and elevations as *A. amhara*, Druce, but is much rarer. It is a beautiful species, of which the first specimens were obtained in 1892.

202. *EUTHALIA (Dophla) DERMA*, Kollar.

Hagen. A very fine, large and rare species which is found from near the sea to the elevation of Bekantschan. It is, like the rare species of *Charaxes*, *Prothoë*, and also *Athyma larymna*, Doubleday and Hewitson, only met with singly or in pairs. Dr. Martin obtained his first pair in 1887 near Toentoengan at a place in a large forest where a Chinese carpenter was sawing wood, and the two butterflies were feeding on the wet sawdust. Dr. Martin possesses specimens from Stabat on the Wampoe River, and from Boekit Mas on the Besitan River. He is under the impression that like a pair of tigers or large birds of prey, which keep a large area of country solely for their own use and benefit and do not allow any other individuals of the same species to intrude into this area, that the above-named large and rare butterflies—but only in the subfamily *Nymphaliniæ*—behave similarly, as there are never found more than one or two specimens of each over a large area. The reason for this Dr. Martin is quite unable to explain.

203. *EUTHALIA (Dophla) DUNYA*, Doubleday and Hewitson.

Hagen. Even rarer than *E. derma*; Kollar. Dr. Martin only possesses two specimens, one from Bekantschan, and one from Kampong Singhapura, five miles south of Namoe Oekor, so is probably in Sumatra confined to the outer hills. It is very common in S.-E. Borneo.

204. *EUTHALIA (Dophla) EURUS*, de Nicéville.

E. (Dophla) eurus, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 15, n. 13, pl. ii, figs. 3, male; 4, female (1894).

Of all the *Euthalias*, this species approaches nearest to the sea, as Dr. Hagen has captured it near Laboean, and Dr. Martin both sexes in the forest between the Saentis Estate and the sea. Found not higher than Bindjei or Selesseh. Both sexes are rare, especially the female.

205. EUTHALIA (*Lexias*) DIRTEA, Fabricius.

Hagen. Grose Smith. Butler. Distant. Was a very common species in Deli before the extension of the tobacco cultivation destroyed nearly the whole of the forests; it occurred round nearly every house, and both sexes were easily captured on the kitchen-midden, especially on discarded fragments of fruit thrown out by the Chinese cook. Still very common behind the house of the manager of the Tandjong Djatti Estate, where there is still left a small forest of teak ("djatti" in Malay) trees. Occurs from November to March, never in high virgin forest, not at a greater elevation than Bekantschan. The female is called "The golden-spot butterfly" by Europeans in the Straits Settlements. It settles with wide open-spread wings, at least when feeding. Dr. Dohrn has bred it at Soekaranda. Males of this species from the mountains are on the underside of both wings far darker than specimens from the plains, and a little bluish in hue.

206. EUTHALIA (*Lexias*) PARDALINA, Staudinger.

Symphædra pardalina, Staudinger, Ex. Schmett., p. 154, pl. liv, male [as *pardalis*, Staudinger] (1886).

A remarkable species, the male and female being alike, and very similar on the upperside to the female of *E. dirtea*, Fabricius, while the male of *E. dirtea* is entirely different from its female, and is therefore quite dissimilar from that sex of *E. pardalina*. It is very rare, and occurs only at higher elevations, at Soengei Batoe and on the Central Plateau, where *E. dirtea* is never found.

207. *EUTHALIA (*Lexias*) CYANIPARDUS, Butler.

Dr. Hagen informs us that he has himself captured a male of this species (which has already been recorded from Borneo) near the Saentis Estate in Deli, and has obtained females by his collectors from Western Sumatra.

208. EUTHALIA (*Felderia*) COCYTUS, Fabricius.

Vollenhoven as *ludekingii*, described from Sumatra, and *blumei*. Felder, as *mitra* described from Sumatra and Banca. Snellen as *blumei*. Hagen as *blumei*, *ludekingii*, and *cocytina*. Grose Smith as *cocytina* and *diardi*. Butler as *ludekingii*. Staudinger as *blumei*. Semper as *ludekingii*. Kirby as *cocytina* and *ludekingii*. Distant as *cocytina*. Five species of the subgenus *Felderia* have been recorded from Sumatra by different writers as enumerated above. To these names might be added *E. stoliczкана*, Distant, *E. maclayi*, Distant, and *E. puseda*, Moore, given by Mr. Distant in "*Rhopalocera Malayana*" from the Malay Peninsula.

Other probable synonyms are *E. gopia*, Moore, *E. godartii*, Gray, described from Sumatra, and *E. monina*, Fabricius. During the time Mr. W. Davison of the Singapore Museum was alive he devoted much time and pains to no purpose in trying to separate into distinct species the many forms recorded by Mr. Distant from the Malay Peninsula, and to this end captured many hundreds of specimens of both sexes, numbers of which he sent to me. In the forests of Sumatra this protean species is equally common, and Dr. Martin has obtained both sexes in large numbers. He and I have quite failed to split them up into separate species. Dr. Staudinger appears also to have succeeded no better. Both sexes are variable, but it is in the female that the variations are the greater and more puzzling. It is quite easy to assign names in accordance with described species to the more conspicuous varieties, but when one comes to arrange large series of specimens one finds how impossible it is to divide them into separate species. The only solution of the difficulty in splitting up this species appears to lie in extensive breeding from the egg. Even supposing the male primary sexual organs should on microscopical examination disclose specific differences, the difficulty will only be half got over, as the question of pairing the females with the males found to represent distinct species will be quite hopeless till both are bred. I have adopted the oldest name for the group. Dr. O. Staudinger has taken the next oldest name, which is the "*Papilio*" *monina*, also of Fabricius. *E. cocytus* is the commonest species of *Euthalia* occurring in our area, and is found everywhere except on the Central Plateau. The males are very easily damaged, and seldom found in collections in an absolutely perfect state. The male is doubtless mimicked on the wing by the males of *Stibochiona kannegieteri*, Fruhstorfer.

209. *EUTHALIA* (*Felderia*) *ASOKA*, Felder.

Snellen. This species was originally described from a female from "Malacca interior" and Borneo; Distant records it from Penang, Province Wellesley, and Malacca. He figures both sexes, and associates with the very distinct female a male with the apex of the forewing rather more produced than in the males of the other species of the group he retains as distinct species, and with the underside of both wings unusually dark, with a broad outer pale margin to the forewing. At the earnest request of Dr. Martin I retain this species as distinct from *E. cocytus*, Fabricius, but it is against my better judgment to do so. The female is typically very distinct, as it has on the upperside of the forewing a prominent band of seven sullied white spots, the anteriormost sometimes divided into two spots, but joined

in both Felder's and Distant's figures; the two posteriormost spots in the submedian interspace somewhat small, placed one above the other; between this macular whitish band and the outer margin is a diffused broad pale blue fascia. I find, however, in my large series of females of this group, that these apparently good and distinct characters are not constant, and that it is well nigh impossible to differentiate this form satisfactorily. Mr. Distant's sexing of the species is probably purely guess work, and cannot be accepted finally without some good proof, such as taking the two sexes paired or breeding both from the egg. It is possible that *E. macnairi*, Distant, is a distinct species and is the same as *E. andersonii*, Moore, in which case Distant's name has a year's priority. Dr. Martin notes that *E. asoka* is the rarest species of the group occurring in our area, and that it is found at higher elevations than the others, not lower than Bekantschan. •

210. EUTHALIA (*Tanaëcia*) VIKRAMA, Felder.

Felder. Grose Smith as *pulasara*. Butler as *pulasara*. Hagen as *pulasara*, var. ? Kirby. Distant. Originally described from Sumatra. This is a local race of *E. (Tanaëcia) pulasara*, Moore, from the Malay Peninsula, but is sufficiently different to be retained as a distinct species. Not rare in the plains of Sumatra.

211. *EUTHALIA (*Tanaëcia*) PELEA, Fabricius.

Snellen. Grose Smith as *palguna*. As far as I am aware, this species is confined to Java, from whence I possess specimens of both sexes. Mr. Moore has figured the male as "*Adolias*" *palguna*, Moore, which is a synonym of *E. pelea*.

212. *EUTHALIA (*Tanaëcia*) SUPERCILIA, Butler.

Grose Smith. Originally described from Penang. Mr. Butler has figured a male. It is entirely unknown to us.

213. EUTHALIA (*Tanaëcia*) PHINTIA, Weymer.

Tanaëcia phintia, Weymer, Stet. Ent. Zeit., vol. xlviii, p. 7, n. 5, pl. i, fig. 6, male (1887).

Weymer. Grose Smith as *aruna*. Originally described from Sumatra. This species is a local race of *E. (Tanaëcia) aruna*, Felder = "*Adolias*" *pardalis*, Vollenhoven, from the Malay Peninsula and Java, but is easily separable from that species. Rather rare, and only occurs at higher elevations and south of Namoe Oekor, at Bekantschan and Soengei Batoe.

214. *EUTHALIA* (*Tanaëcia*) MARTIGENA, Weymer.

Tanaëcia martigena, Weymer, Stet. Ent. Zeit., vol. xlviii, p. 8, n. 6, pl. i, fig. 7, female (1887).

Weymer. Originally described from Sumatra. Occurs in the same localities as the last, and is equally uncommon.

215. *EUTHALIA* NICE'VILLEI, Distant.

One of the rarest insects of our fauna, Dr. Martin having obtained only two specimens during the years he collected in Sumatra, and Dr. Hagen none at all. Found at an elevation of not less than 3,000 feet. It probably escapes capture by the collectors as it is so similar in general appearance to *E. cocytus*, Fabricius, and is thus often passed over for that species.

216. *EUTHALIA* (————) KANDA, Moore.

Hagen. Originally described from Borneo. Dr. Martin has obtained a few specimens at Selesseh, but it is very rare.

217. *EUTHALIA* (————) ELONE, de Nicéville.

E. (Tanaëcia?) elone, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. viii, p. 47, n. 7, pl. L, fig. 3, male (1893).

EXPANSE: ♀, 3·1 to 3·2 inches.

DESCRIPTION: FEMALE. Differs from the male only in its larger size, paler coloration on both surfaces, and on the underside in the absence of the violet suffusion, especially on the hindwing.

A very rare species, found only on the Central Plateau in July and August. Dr. Hagen obtained this species before Dr. Martin, and sent it to London for identification, but unsuccessfully; nor was Dr. Martin more fortunate in sending it to Berlin for the same purpose somewhat later.

218. *EUTHALIA* GARUDA, Moore.

Vollenhoven. Hagen. Staudinger. Whilst all the species of *Euthalia* abovementioned, with the exception of *E. dirtea*, Fabricius, and also all that follow except *E. adonia*, Cramer, are more or less inhabitants of the forest, this species appears only near human habitations, as the food-plant of the larva is the leaves of the mangoe tree, which is always planted near villages and round houses. It is not found therefore at higher elevations, as that fruit tree even at Namoe Oekor does not flourish as it does in the plains. It is most plentiful in January and February, when the males may be continually seen pursuing each other from the shade of one mangoe tree to another.

219. *EUTHALIA JAMA*, Felder.

Hagen. Dr. Martin possesses three males only of this species, all from higher elevations south of Bekantschan.

220. *EUTHALIA ERIPHYLÆ*, de Nicéville.

E. eriphylæ, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. vi, p. 353, n. 7 pl. F, fig. 7, *male* (1891).

E. delmana, Swinhoe, Trans. Ent. Soc. Lond., 1893, p. 287, n. 178.

Found in the Khasi Hills; the Ataran Valley, Meplé and the Daunat Range in Middle Tenasserim, Burma; and at Bekantschan at the foot of the Battak mountains in September, but it appears to be everywhere rare. The type specimen figured and described by me appears to be the dry-season form of this species, which is not found in Sumatra, and is much paler coloured with more prominent markings than the rainy-season form.

221. **EUTHALIA ALPHEDA*, Godart.

Snellen. Both sexes have been figured by Mr. Moore in Trans. Ent. Soc. Lond., New (second) Series, vol. v, p. 66, n. 6, pl. iii, fig. 4 (1858). As far as I am aware, it is confined to Java, from whence I have obtained specimens, unless, as seems probable, the *E. jama* of Distant, but not of Felder, from Province Wellesley and Malacca, is a synonym of *E. alpheda*, in which case it occurs also in the Malay Peninsula (Rhop. Malay., p. 119, n. 4, pl. xiv, fig. 8, *male*, pl. xv, fig. 4, *female* (1883).

222. *EUTHALIA AGNIS*, Vollenhoven.

Adolias agnis, Vollenhoven, Tijd. voor Ent., vol. v, p. 202, n. 27, pl. xii, fig. 2, *female* (1862).

Euthalia agnis, Fruhstorfer, Berl. Ent. Zeit., vol. xxxix, p. 245, pl. xviii, fig. 8, *male* (1894).

Recorded from Java by Vollenhoven and Fruhstorfer. In Sumatra it is only found in the Battak mountains from June to August, and is very rare.

223. *EUTHALIA MERTA*, Moore.

Grose Smith. Originally recorded from China by Mr. Moore, but probably in error. It is found in the Malay Peninsula and at Selesseh in Sumatra, but is excessively rare everywhere.

224. *EUTHALIA SAKII*, de Nicéville.

E. sakii, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 9, n. 8, pl. iii, fig. 3, *female* (1894).

The type is unique, and Dr. Martin says came from Selesseh.

225. *EUTHALIA PARTA, Moore.

Hagen. Originally described from Borneo. Unknown to us.

226. EUTHALIA ? ZICHRI, Butler.

Originally described (but not figured) from Sarawak in Borneo. Distant describes and figures it from Malacca, but neither figure or description exactly agrees with Butler's description of the species. Nor do our Sumatran specimens agree much better with the type or the Malacca example. We have here to do either with one very variable species, or several local races. A considerable series from various localities is required to settle the point. In Sumatra it is exceedingly rare, Dr. Martin has obtained two or three specimens only from the mountains.

227. EUTHALIA ANOSIA, Moore.

Hagen. Everywhere rare throughout its considerable range of habitat. Dr. Martin possesses a single specimen from Kampong Singhapura, south of Namoe Oekor, captured in April, 1891. Besides this specimen Dr. Martin caught another himself at Ayer Panas, 18 miles inland from the town of Malacca, and near the spot where Dr. A. R. Wallace, F.R.S., captured the type of *Prothoë calydonia*, Hewitson, and a third in April, 1895, at the lower end of the Jibi Kola, near Darjiling, in the eastern Himalayas, all these specimens from widely separated localities are precisely similar.

228. EUTHALIA LUBENTINA, Cramer.

Hagen as *lubentina*, Horsfield and Moore [sic]. A rare species in Sumatra as elsewhere. Occurs at higher elevations in Sumatra, at Soengei Batoe and in the Gayoe mountains. Dr. Martin obtained one pair at Kotta Lembaroe in Deli in 1888.

229. EUTHALIA ADONIA, Cramer.

Vollenhoven. Hagen as *adonia*, Horsfield and Moore [sic]. Grose Smith as *adoma* [sic]. Staudinger. Very rare, Dr. Martin has obtained a single female. It seems to occur at the same elevations and localities as *E. garuda*, Moore, and the larva probably feeds on the same tree (mangoe). The specimen now in Dr. Martin's collection was caught by himself on a small mangoe tree behind the Chinese merchant's house near the Battak resthouse in Bindjei town. He saw a second in June, 1894, also on a mangoe tree in the garden of the Loboë Dalam hospital, but as he was on duty, he could not secure it. He has never seen a male.

230. EUTHALIA (*Nora*) RAMADA, Moore.

Hagen. Not very common, found from Selesseh to Bekantschan.

231. EUTHALIA (*Nora*) DECORATA, Butler.

Originally described as *Adolias decoratus* from Singapore, and both sexes figured by Butler.

232. EUTHALIA (*Nora*) ERANA, de Nicéville.

E. (Nora) erana, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. viii, p. 46, n. 6, pl. L, figs. 1, male; 2, female (1893).

Snellen as *salia*. Hagen as *salia*. The *E. (Nora) salia* of Moore is quite distinct from the present species, and is confined to Java, from whence I possess both sexes. *E. erana* is very near to *E. decorata*, Butler, but the much less extent of the bronzy-greenish (in some specimens purplish) coloration, and the greater width and purer whiteness of the inner macular band of the hindwing on the upperside will at once distinguish the males of the two species. Together with *E. decorata* it is found in both large and small forests, and at no very great elevation. Neither species is rare.

233. *EUTHALIA (*Nora*?) LAVERNA, Butler.

Hagen. Grose Smith. The male is figured in colours by Mr. Distant from Malacca, the female in black and white from Penang. We have been unable to recognise it from Sumatra. Distant's figure of the male has much more the appearance of a female than of the opposite sex. The Bornean form I have named *E. (Nora) lavernalis*.

234. PYRAMEIS CARDUI, Linnæus.

Snellen. Hagen. Grose Smith. Semper. This cosmopolitan butterfly occurs only on the grassy plains of the Central Plateau, often in large numbers. Dr. Martin only once met with a specimen in the plains near Toentoengan in June, 1888, where it might have been carried by one of the sudden storms known locally as "Sumatrans." The late Herr Hourath, to whom Dr. Martin sent specimens of this species in a letter, at a meeting of the Berlin Entomological Society drew attention to the conspicuously small size, the much darker than normal coloration of the upperside of the hindwing, and the unusually large white triangular spot present on the underside of the hindwing of the Sumatran form.

235. *PYRAMEIS SAMANI, Hagen.

P. samani, Hagen, Iris, vol. vii, p. 359 (1894).

Dr. Hagen described this species from a single torn example

obtained in the Karo hills. It is near to *P. dejeanii*, Godart, from Java. Dr. Martin has seen the specimen, which seems to represent a very good though rare species, as his Battak collectors never succeeded in capturing it. It will probably be found more plentifully when the mountains of the Gayoe- and Allas-lands are explored.

236. *VANESSA BATTAKANA*, de Nicéville, n. sp.

HABITAT: N.-E. Sumatra.

EXPANSE: ♂, 2.5; ♀, 2.6 inches.

DESCRIPTION: MALE and FEMALE. Nearest to *V. perakana*, Distant, from the Malay Peninsula, from which it may be known by the discal blue band on the UPPERSIDE of the *hindwing* being much broader, invading the discoidal cell; in the type of *V. perakana*, now before me, which is a female, it is much narrower, not nearly extending to the cell. The Javan agrees with the Perak species in this feature.

Occurs on the Central Plateau and the high mountains which surround it in May and December, but is very rare, as Dr. Martin has not obtained more than eight or ten specimens during his residence in Sumatra. Dr. Hagen has recently caught it in South Sumatra on Mount Kaba, 5,200 feet, a volcano near Mount Dempo, which is also a volcano.

237. *SYMBRENTHIA HIPPOCLUS*, Cramer.

Hagen as *hyppoclus* [sic]. Staudinger as *hyppoclus* [sic].

238. *SYMBRENTHIA COTANDA*, Moore.

Hagen as *hypselis*, Godardt [sic]. Staudinger as *hypselis*. I consider that the true *S. hypselis*, Godart, is confined to Java; the Indian, Burmese, Malayan Peninsula and Sumatran form being *S. cotanda*, Moore = *S. sinis*, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. vi, p. 357, n. 10, pl. F, fig. 9, *male* (1891).

239. *SYMBRENTHIA HYPATIA*, Wallace.

S. hypatia, Fruhstorfer, Stet. Ent. Zeit., vol. Iv, p. 125, pl. iii, fig. 4, *male* (1894).

Hagen. Distant has figured this species from Perak, and Fruhstorfer from W. Java, both from males, but neither figure is good. The three Sumatran species of *Symbrenthia* are fairly common on suitable spots, and are thus distributed:—*S. hippoclus*, Cramer, occurs nearest to the sea, but extends over the whole of our area up to the Central Plateau. *S. cotanda*, Moore, first appears south of Namoe Oekor, Dr. Martin took his first specimen near Kampong Singhapura. *S. hypatia* is first met with at the elevation of Bekantschan; both the last-named species extend

to the Central Plateau. They like low and small forest, or open places in large forest, and settle on roads and also on the leaves of shrubs and low-growing plants with open wings. Dr. Martin has bred *S. hippoclus* on the Rameh plant (*Urticaceæ*); the larvæ live socially, five or six together, in a single leaf with its edges joined by silk strands so as to make a shelter. The pupæ are somewhat similar to those of *Vanessa urticæ*, Linnæus, the "Small Tortoiseshell Butterfly" of Europe, and like the species of *Vanessa* and *Pyrameis* the newly-emerged butterfly emits a pigmented fluid of a red colour. The larvæ are common in November and December, the butterflies are very plentiful during the first months of the year, but all the remaining months of the year they are only seen sporadically and rarely. It appears possible that *S. hippoclus* is single-brooded, and that some surviving examples live throughout the year and propagate the species the next season. The second (white) form of female which occurs in Java is not found in Sumatra. All the species of *Symbrenthia* are on the upperside of the wings very similar to the small yellow species of *Neptis*, which they may perhaps mimic when at rest, but their flight is totally different, being excessively rapid, so that it is almost impossible to follow them with the eye.

240. RHINOPALPA POLYNICE, Cramer.

Hagen. Semper as *polinice* [sic]. Kirby. Staudinger. This species was described and figured by Cramer from a male from the west coast of Sumatra. *R. fulva*, Felder, described from Malacca, is an absolute synonym, specimens from Assam, Burma, and the Malay Peninsula being indistinguishable from Sumatran ones. The Javan species, *R. elpinice*, Felder, is quite distinct. *R. polynice* is found only in large forest, and occurs all over our area except in the higher mountains and on the Central Plateau. The males are fond of fæces on forest roads; the females are very rare and seldom seen in collections. Perhaps they escape capture by their coloration being very different from that of the males, as on the wing the female closely resembles a common *Cirrhochroa*.

241. CYRESTIS NIVALIS, Felder.

C. nivea, Zinken-Sommer, var. *interrupta*, Snellen, Tijd. voor Ent., vol. xxxiii, p. 217 (1890).

Grose Smith as *nivea*. Snellen as *recaranus*, Westwood (= *nivea*, Zinken-Sommer, teste Snellen), and as *nivea*, var. *interrupta*. Hagen as *nivea*. Staudinger as *nivea* var. *nivalis*, and *nivalis*. *C. nivalis* is a good species, and is found commonly in Burma, the Malay Peninsula, Sumatra and Borneo, and differs from *C. nivea*, Zinken-Sommer, from

Java "In not having a continuous fuscous [costal] margin to the forewing on the upperside, and in the greater amount of ochraceous coloration near the anal angle of the hindwing on the upperside." (*Distant*). Found in Sumatra from near the sea to Soengei Batoe on forest roads, where it settles with wide-spread wings on moist places and by the side of small pools; if pursued it settles on the underside of leaves by the roadside. On the wing when flying rapidly along a forest road in search of moisture it may easily be taken for a pierine butterfly. All the butterflies of this genus in India are well named "The Map" from their characteristic markings and coloration.

242. CYRESTIS IRMÆ, Forbes.

C. irmæ, Forbes, A Naturalist's Wanderings, p. 274 (1885).

C. mænalis, var. *sumatrensis*, Staudinger, Ex. Schmett., p. 133 (1886).

Forbes. Staudinger as *mænalis*, var. *sumatrensis*. Semper as *mænalis*. I have redescribed this species in Journ. Bomb. Nat. Hist. Soc., vol. vi, p. 358, n. 11 (1891). It occurs in the hills of Perak in the Malay Peninsula at 3-4,000 feet elevation. *C. mænalis*, Erichson, is a distinct species, and is found in the Philippine Isles. From the point where *C. nivalis*, Felder, no longer occurs, at Soengei Batoe and on the higher mountains and the Central Plateau, this beautiful and very distinct species is found commonly throughout the year. It is somewhat smaller than *C. nivalis*. The Battak collectors report that it comes down to the small hill streams in crowds with numerous *Pierinæ* to suck up the moisture.

243. CYRESTIS PERIANDER, Fabricius.

Grose Smith. Staudinger. This beautiful species occurs only on the western boundary of our area at higher elevations. Herr M. Ude, the European collector of Dr. H. Dohrn, took some thirty specimens near Bohorok in May, 1894. Dr. Martin obtained his first specimens from Kepras in January, 1895, and also a single example, perhaps a straggler to the south-east, from the Karo mountains in December, 1894. Dr. Martin has caught it himself on the Penang Hill, or "The Crag."

244. CYRESTIS THERESÆ, de Nicéville.

C. theresæ, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 18, n. 14, pl. v, fig. 8, male (1894).

Dr. Martin obtained a single specimen in May, 1893, from the forest near Selesseh, caught by a very clever and intelligent Chinese collector. Mr. de Nicéville recognised it at once as a species new to science, and at Dr. Martin's request named it in honour of H. R. H. Princess Therese of Bavaria, who is well-known by her valuable

works as a scientific traveller. As Dr. Martin almost simultaneously received a large consignment of butterflies from S.-E. Borneo (Bandjermasin), and amongst them a considerable number of this species, we were surprised to find that it had not already been described from that island. It is probable that it previously stood in collections as the really very distinct *C. lutea*, Zinken-Sommer. The late Professor Westwood appears to have been of opinion that the yellow male of *C. lutea* has a *white* female. I have never seen a female of that species, though the male is excessively common. Even Dr. Staudinger has no female in his unrivalled collection so he writes to me. *C. theresæ* stands in his collection under the MS. name of *C. thyonneoides*, from Borneo.

245. CYRESTIS (*Chersonesia*) RAHRIA, Moore.

Hagen as *rahria*, Westwood [sic]. Staudinger as *rahria*, Westwood [sic]. A common species in Burma, the Malay Peninsula, Nias, Sumatra, Java, and Borneo. The name *rahria* is a MS. one of Westwood's; as Moore figured it (though he did not describe it), the species is properly Moore's.

246. CYRESTIS (*Chersonesia*) INTERMEDIA, Martin.

C. intermedia, Martin, Einige neue Tagschmetterlinge von Nordost-Sumatra, pt. 2, p. 4, n. 5 (1895).

247. CYRESTIS (*Chersonesia*) PERAKA, Distant.

Always a rare species, I possess specimens from the Daunat Range, Tenasserim, Burma; Perak in the Malay Peninsula; and Bekantschan and the Battak mountains of Sumatra taken in July and October. Dr. Martin has specimens from Java.

248. CYRESTIS (*Chersonesia*) NICEVILLEI, Martin.

C. nicévillei, Martin, Einige neue Tagschmetterlinge von Nordost-Sumatra, pt. 2, p. 4, n. 6 (1895).

Rare, occurs only in the Battak mountains in May and July. It is a very distinct species, the coloration of the upperside is of a very rich and deep orange, and the fourth pair of black lines counting from the base of the wing on the upperside of the forewing is twice broken, a unique character in the subgenus.

249. CYRESTIS (*Chersonesia*) CYANEE, de Nicéville.

C. (Chersonesia) cyanee, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. viii, p. 49, n. 8, pl. L, figs. 6, male; 7, female (1893).

A local race of *C. risa*, Doubleday and Hewitson, found from

Kumaon to Assam and in Burma, also recorded from Java. Dr. Martin in "Einige neue Tagschmetterlinge von Nordost-Sumatra," pt. 2, p. 7, (1895), records *C. cyanee* from Burma, but probably in error, as far as I know it is confined to N.-E. Sumatra. All the species of *Chersonesia* in Sumatra occur only in forests, and unlike true *Cyrestes* never go to roads or moist places, but keep to low bushes and rest on the underside of the leaves. They fly weakly and are easily captured. Nearest to the sea, plentiful near Laboean, appears *C. rahria*, Moore. Higher up, from Namoe Oekor to Bekantschan, occurs the small *C. peraka*, Distant. From Bekantschan to the Central Plateau fly *C. cyanee* and *C. nicévillei*, Martin. *C. intermedia*, Martin, is confined to the North-Western limits of our area, as all the specimens were obtained from the Gayoe collectors. *C. rahria* and *C. cyanee* are the common species, *C. peraka* and *C. intermedia* are very rare, and the most beautiful and distinct *C. nicévillei* is the rarest of all.

250. *KALLIMA BUXTONI*, Moore.

Snellen as *paralecta*. Hagen as *paralecta*. Both sexes of this species were originally described from Sumatra; it occurs also in the Malay Peninsula at Perak and Sungei Ujong, and again in Borneo. The apex of the forewing in the female is not produced into a long point in this species as it is in many others. I was incorrect in stating in the Gazetteer of Sikhim, p. 146, n. 226 (1894) that the Sumatran *Kallima* like the Javan *K. paralecta*, Horsfield, has a yellow-banded male and a bluish-white-banded female, both sexes being alike in this particular. When writing the paragraph in question, I had yellow males and bluish-white females only from Sumatra, so came to the perhaps natural conclusion that the phenomenon which is unique in the Javan occurs also in the Sumatran species. Since then I have obtained both sexes of both the Sumatran species of *Kallima*, and find that the opposite sexes of each are alike. *K. buxtoni* is always a rare insect in Deli, occurring from Selesseh to Bekantschan. It is very fond of imbibing the sap from wounded trees. The Malay and Javan collectors call it "Koepoe Bandera, the Flag Butterfly," as its red and blue colours resemble the same colours in the Dutch tricolour.

251. *KALLIMA SPIRIDIVA*, Grose Smith.

K. spiridiva, Grose Smith, A Naturalist's Wanderings, p. 274 (1885); *K. spiridion*, Grose Smith and Kirby, Rhop. Ex., pl. *Kallima* i, figs. 1, 2, male (1892).

Grose Smith. FEMALE differs from the male only in the hindwing on the upperside being paler, more brown; and in the forewing having the apex produced into a somewhat short point, half the length of that

found in the female of *K. knyvettii*, de Nicéville, from Bhutan, which is a closely allied species. Occurs at higher elevations than *K. buxtoni*, Moore, from Bekantschan to the mountains which surround the Central Plateau in April and July; is also rarer than the yellow species. Both are found only in large forest.

252. *DOLESCHALLIA PRATIPA*, Felder.

Snellen as *bisaltide*. Hagen as *bisaltide* and *pratipa*. Distant doubtfully from Sumatra as *bisaltide*. The Sumatran form agrees exactly with the one from the Malay Peninsula which has been described by Felder as *D. pratipa*. Whether it should be known by the older names of *D. bisaltide* or *D. polibete*, both of Cramer, I am not prepared to say, as several of the species of this genus are so variable that to define their limits seems the more difficult the greater number of specimens one obtains, more especially as the variations do not appear to be confined to geographical areas. The female of the Sumatran form agrees very fairly with Cramer's figures C and D of pl. cii of Pap. Ex., which also appears to have been taken from a female, and is named "*Papilio*" *bisaltide* from "Surinam," a probable *lapsus calami* for Sumatra. But I have no specimen agreeing exactly with that figure. The Himalayan, Assamese, Burman, South Indian, Ceylonese, Andamanese and Nicobarese form is fairly constant, and is usually identified as *D. polibete*, originally described from Amboina. Hagen records two species of the genus from Sumatra, but this is almost certainly incorrect. *D. pratipa* in Sumatra flies from near the sea to the elevation of Bekantschan, but not higher, and is found in forests and also near houses which are surrounded by fruit trees and small jungle. The females are much rarer than the males. The latter are especially partial to settling on old wood, and are commonly found resting on or flying round wooden bridges on forest roads. Dr. Martin has frequently noticed them resting on wooden bullock carts left on jungle roads, to which they return again and again if disturbed. Dr. Hagen bred it at Laboean, the larva feeding on the Jack-tree (*Artocarpus integrifolia*, Linnæus).

253. *CHARAXES (Eulepis) DELPHIS*, Doubleday.

Hagen. Kirby as *concha*. The *C. concha* of Vollenhoven was described from Padang, Sumatra, and is a synonym of this species. Next to *C. kadenii*, Felder, this is the most beautiful species of *Charaxes* found in Sumatra. It occurs from near the sea to the elevation of Bekantschan, but not higher. Though it is met with everywhere over a large area it is never as plentiful as are *C. dolon*, Westwood, and *C. eudamippus*, Doubleday, in Sikhim in the beds of streams in the spring. As the

Gayoe collectors brought this species in some numbers, it may perhaps be less rare in the north of Sumatra. No female has been obtained. The male is fond of fæces on forest roads; also small pools and moist places on roads, especially if there are any *Pierinæ* assembled to suck up the moisture, with whom the big *Charaxes* always associates. In such spots will be found sitting in the hottest sun perhaps half a hundred or more *Catopsilias* and *Appias hippo*, Cramer, and amongst them one *Charaxes delphis*, numbers of similarly-coloured butterflies evidently affording mutual protection. Dr. Martin's Javan collector Saki in consequence of this characteristic used to call *C. delphis* the "Koepoe Raja," because it sat amongst the *Pierinæ* like a Raja surrounded by his followers. *C. delphis* is not restricted only to big jungle, but is found on roads far from the forest, if only there are assembled the protecting *Pierinæ*. Dr. Martin notes that in 1886 he gave up collecting for some time, till in August, 1887, when on his way to pay a medical visit at the Kloempang Estate, he saw at five o'clock in the evening a fine specimen of *C. delphis*, which was seeking a comfortable night's lodging under the roof of a tobacco shed. As Dr. Martin was on horseback he could not catch the butterfly, but on shewing it to a passing Chinese coolie this man was so clever as to kill it without any damage by throwing a piece of wood at it. Dr. Martin took it home in his note book, and from that day commenced a new collection on pins, which is now in the Royal Museum at Munich, and of course includes this specimen which instigated his commencing to re-collect, and to which may also be due the production of this paper.

254. *CHARAXES (*Eulepis*) SCHREIBERI, Godart.

Dr. Hagen informed Dr. Martin that he obtained this rare species from his Gayoe collectors. It would appear that the north-western boundary of our area is the head-quarters of the genus in Sumatra, as the Gayoes always brought in three or four times as many specimens of *Charaxes* as the Battaks did. *C. schreiberi* probably does occur in Sumatra, as it is certainly found in the Malay Peninsula, Java and Borneo. It is singular, however, that Dr. Hagen should have omitted it from both his papers. Dr. Martin picked up from the ground two forewings without body of this species in Fort Cauning in the middle of Singapore. It is most remarkable how frequently the only record we have of this species is from single wings picked up in a similar way. It would seem to be that *C. schreiberi* is greatly persecuted by birds.

255. CHARAXES (*Eulepis*) KADENII, Felder.

Dr. Wallace obtained the first known specimen of *C. kadenii* in

Western Java at a high elevation in 1861, and very appropriately called it "The Calliper Butterfly," since when only very few specimens have reached Europe. In 1889 Dr. Martin found only one old and worn specimen in all the larger German collections when visited by him, which specimen is now in the Berlin Museum. The first in Sumatra was obtained from the Central Plateau in 1892, where alone it is found, and although Dr. Martin offered a special bonus of a dollar for every further specimen, only seven in all were brought in. Nearly all were captured on the fæces of Karbouw buffaloes, deposited on the sandy river banks where the buffaloes used to drink. Herr H. Fruhstorfer was sent to Java by the late Herr Honrath to collect *Rhopalocera*, but with special instructions to look out for *C. kadenii*, but he was not successful in getting it. Since then a retired non-commissioned officer of the Dutch Indian Army settled in Java, Heer C. E. Prillwitz, has captured eight specimens in Preanger.

256. CHARAXES (*Eulepis*) ATHAMAS, Drury.

Snellen. Hagen as *athamas* and *samatha*. Mr. Moore described *C. samatha* from Tenasserim, and afterwards recorded and figured it from Ceylon. It is a synonym of *C. athamas*, which latter is without doubt the commonest of all the *Charaxes* in Deli, occurring from near the sea to Bekantschan and Soengei Batoe; females are very rare. The males are very fond of moist places and fæces, to which they will always return after being disturbed; when frightened they retire temporarily to the leaves of the higher trees well out of reach, and settle with folded wings. On the wing they are not easily differentiated from the *Pierinæ*, only their flight is very much stronger and more rapid.

257. CHARAXES (*Eulepis*) HEBE, Butler.

Grose Smith. Butler. Staudinger. Kirby. Distant. Originally described from Sumatra.

258. CHARAXES (*Eulepis*) MOORI, Distant.

Hagen.

259. CHARAXES (*Eulepis*) JALYSUS, Felder.

We have here to do with three very difficult species, or perhaps we may say two, as *C. jalysus* appears to be fairly constant, though I am not at all sure that it will not hereafter be found to gradually merge into the two previously-named species. *C. jalysus* has the greenish-white areas of both wings on both sides the largest of the three. *C. moori* appears to be best distinguished from *C. hebe* by having the inner

edge of the broad outer black margin to the forewing on the upperside straight and even, ending sharply on the inner margin of the wing at some distance from the inner angle, in *C. hebe* the inner edge of the band is much waved, it does not end sharply on the inner margin, and it often ends at the anal angle instead of extending along the inner margin for some distance as it always does in *C. moori*. The width of the outer black border to the hindwing on the upperside is very variable, but it appears to be usually broader and better defined in *C. moori* than in *C. hebe*, in which latter species it is sometimes reduced to a double series of black spots (as in Butler's figure) being the remnants of incomplete ocelli. The width and extent of the greenish-white areas on the underside are excessively variable in the two species, and as far as I can judge from my large series of specimens from the Malay Peninsula, Sumatra, Java, and Borneo, present no specific characters. Herr Röber in Ent. Nach., vol. xx, p. 290, and vol. xxi, p. 63 (1894-95), has been at the pains to define the *athamas*, *hebe*, and *jalyus* groups of *Charaxes*, and describes many new species, with which we have to deal with *C. heracles*, Röber, from Borneo (in his first paper), and from Borneo and Deli in Sumatra (in his second paper), supposed to be a local race of *C. moori*; and *C. albanus*, Röber, from Deli, Sumatra, supposed to be a local race of *C. hebe*. These two species have been described from most inadequate material, and are in my opinion absolute synonyms of *C. moori* and *C. hebe* respectively. Considering the many bad species that have been created in the *C. athamas* group, it is extraordinary that Herr Röber should have evolved a similar chaos in the *C. hebe* group. In the *C. athamas* group he describes from single female examples *C. fruhstorferi* from South Java, and *C. phrixus*, also from Java, while admitting that he has never seen the female of the most common of all the species of the group, *C. athamas*, Drury. In his first paper he puts *C. hebe* and *C. moori* in one group, in his second paper he makes two groups of them. In his first paper he gives *C. hebe* from Sumatra, in his second he gives the Sumatran form of *C. hebe* a new specific name, though the species was originally described from Sumatra, and names the Javan form of *C. hebe*—*C. javanus*. Mr. Fruhstorfer in Ent. Nach., vol. xxi, p. 197 (1895) has described still another *Charaxes* from North Borneo of the *moori* group, which he has named *C. sandakamus*.

The three foregoing species are all much rarer than *C. athamas*, but are quite similar in their habits. *C. hebe* and *C. moori* occur at lower elevations in the Battak mountains from Selesseh to Bekantschan, whereas *C. jalyus* was mostly captured by the Gayoe collectors in the forests west of Langkat leading to their country. We have seen no females of either of these species.

260. CHARAXES ECHO, Butler.

Originally described from Singapore, recorded from Borneo by Druce. It is one of the rarest insects in our area, as two specimens only have been captured, both in high forest near Selesseh. It is smaller and darker than the allied *C. fabius*, Fabricius, of India and Burma.

261. CHARAXES (*Haridra*) BORNEENSIS, Butler.

Grose Smith. Distant. Like *C. delphis*, Doubleday, and *C. jalysus*, Felder, except a few specimens from the Battak mountains, has only been captured in the forests west and north of Selesseh, by the Gayoes while collecting gutta percha. Dr. Martin possesses one specimen taken in Asahan in 1891. We have not seen its female.

262. CHARAXES (*Haridra*) DURNFORDI, Distant.

This species was originally described from Sungei Ujong in the Malay Peninsula from a single male. An allied species is *C. nicholii*, Grose Smith, described from Burma, and figured in *Rhopalocera Exotica*, vol. i, pl. *Charaxes* ii, figs. 1, 2, male (1887). I possess a single specimen of this very rare species caught by Colonel C. T. Bingham in October, in the bed of the Kaukareit stream at the foot of the Daunat Range, Tenasserim, which differs from the figure of *C. nicholii* in its larger size, the ocelli on the upperside of the hindwing larger, within which from the costal nervure to the first median nervule is a waved black line, anteriorly prominent, posteriorly becoming obsolete. *C. durnfordi* is very rare in Sumatra, rarer even than *C. kadenii*, Felder, as Dr. Martin obtained only five specimens. Occurs in heavy forest on the lower ranges and outer spurs of the Battak mountains, where Dr. Martin in 1888 captured his first male specimen at Roemah Kenangkong, now in the royal collection at Munich. Dr. Hagen took a male in 1891, at Bandar Quala in Serdang. In 1892 Dr. Martin received a female from a Battak collector, which is larger and duller coloured than the male, the whitish-violet markings on the upperside of the hindwing of greater extent, and the tails longer.

263. CHARAXES (*Haridra*) HARPAX, Felder.

Hagen. Snellen as *polyxena*. Moore. It was originally described without habitat; and has been recorded from Lower Burma, the Malay Peninsula, Sumatra, and Borneo. *C. polyxena*, Cramer, was described from a male from China, and is the oldest name of all the tawny group of *Charaxes*. *C. harpax* is found in Sumatra from the

sea (Paya Bakong) to Bekantschan. It occurs in every forest, where it is especially partial to fæces and moist spots. It is a very variable insect as regards the extent of the black coloration on the upperside of the forewing, and the colouring of both wings on the underside. Some of our specimens agree very well with Mr. Moore's figures of *C. corax*, Felder, in Lep. Ind., vol. ii, pl. clxxv (1895). This species is restricted by Mr. Moore to Sikhim, Bhutan, Assam and Burma. Other specimens agree very closely with the figures of *C. hierax*, Felder, given on the next plate of Mr. Moore's work above mentioned, and recorded by him from Assam only. Of the three names, *harpax*, *corax*, and *hierax*, the last is the oldest. It is more than probable, however, that the species will hereafter stand as *C. baya*, Moore, originally described from Java, which is still older, and with the description of which (it has never been figured) some of our specimens agree very closely. The females are very rare; Dr. Martin possesses two only. The tails are much longer than in the male, and somewhat spoon-shaped, one specimen in Dr. Martin's collection has two tails, one each at the terminations of the first and third median nervules.

264. CHARAXES (*Haridra*) ARISTOGITON, Felder.

Originally described without locality, but found in the eastern Himalayas, Assam, Burma, the Malay Peninsula, and Sumatra. Our specimens agree better with Mr. Moore's figures of *C. desa*, Moore, Lep. Ind., pl. clxxii, from Lower Burma, but I am not prepared to admit that species to be distinct from *C. aristogiton*. Occurs only at the higher elevations, from Bekantschan to the Central Plateau, is not very common, and is not at all variable as is *C. harpax*, Felder. The underside of both wings is of a richer and darker red than in specimens from Sikhim. No female has been obtained.

265. CHARAXES (*Haridra*) DISTANTI, Honrath.

Originally described from Perak and Sarawak (Borneo). It is perhaps a local race of *C. marmax*, Westwood, from the eastern Himalayas, Assam and Burma, but may be instantly known from it by the basal half of the costa of the forewing on the underside being pure snow-white instead of concolorous with the rest of the wing. Occurs in Middle Tenasserim of Lower Burma, and in Sumatra in the forests of the plains, at Paya Bakong and at Selesseh, perhaps not higher than Namoe Oekor. It is a rare species, and we have not seen its female.

266. PROTHOE CALYDONIA, Hewitson.

Originally described from Malacca. Two local races of this splendid

butterfly have recently been defined, *P. belisama*, Crowley, from Tonghou, Central Burma, and *P. chrysodonia*, Staudinger, from Davao, S.-E. Mindanao, in the Philippine Isles. In Sumatra *P. calydonia* is found only in forest from Selesseh to Bekantschan and higher, and is rare as it always is everywhere. Dr. Martin took his first specimen, the first known from Sumatra, in October, 1888, near Kampong Roemah Kenangkong on a wounded tree where it was sucking up the juice. Since then he has obtained eight other specimens. As above mentioned (p. 420, n. 202), there may be found over a large area of forest only one pair of this strong-winged butterfly, which likes to keep to the higher trees, quite out of the reach of the net, but is fond of fæces and strong smelling things such as carrion, to which it is often attracted and caught. From Wallace's account of the capture of the type specimen of the species at Ayer-panas in Malacca it is known how closely this insect keeps to one place, even to the same tree. It was on the fourth day, after having missed it the three previous days, and on the very same tree, that Dr. Friedl Martin caught his first specimen at Aer Kesoengei in Asahan. *P. calydonia* settles with the head downwards on tree trunks, and makes while feeding the same rotating movements of the hindwings as is done by many *Lyccænidæ*.

267. PROTHOE ANGELICA, Butler.

Grose Smith as *franckii*. Hagen as *frankii* [sic], Godardt [sic]. Wallace as *franckii*. Distant. Semper. The true *P. franckii*, Godart, is confined to Java. Occurs in Sumatra in the same localities and elevations as *P. calydonia*, Hewitson, but is not so rare; settles also on tree trunks with its head downwards.

Family LEMONIIDÆ.

Subfamily LIBYTHÆINÆ.

268. LIBYTHEA MYRRHA, Godart.

Hagen as *myrrha*, Godardt [sic]. Found in forest from Selesseh to Soengei Batoe, and is not very common. It is fond of settling with folded wings on wet sand on the banks of small streams.

269. LIBYTHEA NARINA, Godart.

The *L. rohini* of Marshall is a synonym of this species. Occurs in Sumatra near to the sea, as Dr. Martin obtained his first specimen near Kamborg-house between the Saentis and Mabar Estates in May, 1890. Found also at Selesseh, but does not extend higher than Namoe Oekor, and is very rare.

Subfamily NEMEOBIINÆ.

270. ZEMEROS ALBIPUNCTATA, Butler.

Hagen as *flegyas*. Staudinger. Distant.

271. ZEMEROS EMESOIDES, Felder.

Hewitson. Grose Smith as *Temeros* [sic] *emesoides*. Both species of *Zemerops* are found chiefly in forests on the flowers or red fruits of some shrub of medium height, on which they feed. They rest with half open wings. Both species are very delicate, and it is almost impossible to obtain a perfect example of either for the cabinet. *Z. albipunctata*, Butler, is much the commoner, and is spread over the whole of our area; whereas *Z. emesoides* is much rarer, does not occur near the sea, and is found from Selesseh to Bekantschan.

272. STIBOGES NYMPHIDIA, Butler.

Hagen. Found only on the Central Plateau, and is rare even there, as in all Dr. Martin has only obtained six specimens in thirteen years.

273. TAXILA THUISTO, Hewitson.

Hewitson. Hagen. Grose Smith. Distant. Rare in Deli, occurs in forests only from Selesseh to Bekantschan.

274. TAXILA HAQUINUS, Fabricius.

Hagen. Staudinger. Hewitson as *drupadi*. The "*Emesis*" *drupadi* of Horsfield, described from Java, is a synonym of this species. Very common in the forests of the plains, abounded in April and May, 1894, near Selesseh. Both the species of *Taxila* are fond of the same shrub frequented by the two species of *Zemerops*.

275. LAXITA DAMAJANTI, Felder.

Snellen. Staudinger as *tanita*. For remarks on *L. tanita*, Hewitson, see de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 22 (1894). It appears that Staudinger's *tanita* = *damajanti*.

276. LAXITA LYCLENÉ, de Nicéville.

L. lycleene, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 21, n. 17, pl. ii, fig. 10, male (1894).

Hewitson as *telesia*. Hagen as *telesia*. Grose Smith as *telesia*. Staudinger as *telesia*. Kirby as *telesia*. Distant as *telesia*. This is a local race of *T. telesia*, Hewitson, from Borneo.

277. LAXITA ORPHNA, Boisduval.

Hewitson. Grose Smith. All the species of *Laxita* are of weak flight, and found in forests only. Owing to their very delicate structure and colours, perfect specimens are very scarce. *L. lyclene*, de Nicéville, is the commonest, and occurs in the plains, very plentiful near Selesseh together with *T. haquinus*, Fabricius. *L. damajanti*, Felder, is less common from Namoe Oekor to Bekantschan. *L. orphna* is decidedly rare, and is found from Bekantschan to the Central Plateau.

278. ABISARA SAVITRI, Felder.

Hewitson as *susa* and *savitri*. Hagen. Grose Smith as *susa*. Staudinger. The "*Sospita*" *susa* of Hewitson is a synonym of this species, and is so given by Hewitson himself.

279. ABISARA AITA, de Nicéville.

A. aita, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. viii, p. 49, n. 9, pl. L, fig. 10, male (1893).

HABITAT: N.-E. Sumatra.

EXPANSE: ♀, 2.15 inches.

DESCRIPTION: FEMALE, differs from the male in being slightly larger, the ground-colour of the UPPERSIDE of *both wings* is dull ferruginous instead of dull hair-brown, the two discal bands of the *forewing* are wider and more prominent, and the white area of the *hindwing* is rather larger. UNDERSIDE shews the same differences as are found on the upperside.

The two species of *Abisara* with tails are rare, and are somewhat stronger on the wing than the other species of the subfamily. *A. savitri*, Felder, belongs to the forests of the alluvial plain, whereas *A. aita* is only found at high elevations, from Soengei Batoe to the Central Plateau. Dr. Martin first received the latter from his Battak collectors in July, 1893.

280. ABISARA KAUSAMBI, Felder.

Hewitson. Hagen as *echerius*, var. *kausambi*. Butler as *Albisara* [sic] *kausambi*. Distant. A distinct species, the male of which has two pale bands crossing the disc of the *forewing* on the upperside, the outer of which is anteriorly developed into a somewhat broad whitish fascia. The *hindwing* on the upperside shews two apical and two anal black spots. It was originally described from the Malay Peninsula; I possess specimens from Perak, Jelebu and Singapore, also in the Malay Peninsula, and from Sumatra and Borneo.

281. ABISARA KAUSAMBIODES, de Nicéville, n. sp.

A. kausambi, Distant (*nec* Felder), Rhop. Malay., p. 189, n. 2, pl. xviii, fig. 10, male (1883).

HABITAT: Penang and Perak in the Malay Peninsula, N.-E. Sumatra, Nias.

EXPANSE: ♂, 1.8 to 1.9 inches.

DESCRIPTION: MALE. UPPERSIDE, *both wings* rich dark prune-coloured, beautifully glossed with dark purple in some lights, much more so than in either sex of *A. kausambi*, Felder; without markings. UNDERSIDE, *both wings* of the same rich prune-colour as on the upperside, but without purple reflections. *Forewing* with the usual pair of discal parallel narrow pale purplish lines, which widen out somewhat on nearing the costa; a narrow submarginal whitish line from the anal angle, becoming obsolete beyond the middle of the wing. *Hindwing* with the usual pale discal band, three apical and two anal black spots each bearing outwardly a fine white line, between these spots in the median interspaces are a pair of pale lunules, a submarginal narrow dark line, inwardly defined with a very fine white line.

I have described this species as new with some reluctance, as the butterflies of this group of the genus *Abisara* are obviously very variable, these variations being apparently not confined in some cases to geographical areas, so that the numerous names which have already been given to many of these varietal forms are by no means easy to allocate. There are, however, obviously two species of *Abisara* of this group occurring in the Malay Peninsula and N.-E. Sumatra, the males of both being easily separable. *A. kausambi*, Felder, is much ornamented with whitish bands and black spots on the upperside, while *A. kausambioides* is entirely plain and unmarked; the ground-colour of the latter is also much deeper. The females of the two species I am unable to differentiate. Mr. Distant's figure and description of the male quoted above evidently applies to the present species, and do not at all agree with Felder's description of the male of *A. kausambi*.* *A. kausambioides* is perhaps nearest to *A. prunosa*, Moore, from Ceylon, but that species has the male normally ornamented with pale bands and black spots on the upperside. The two non-tailed *Abisaras* are not uncommon in N.-E. Sumatra, *A. kausambi* occurring near the sea (Loboe Dalam) to Namoe Oekor, while *A. kausambioides* is found from Namoe Oekor to Bekantschan. Both are of very delicate structure,

* See the last paragraph on p. 324 of Butt. of India, vol. ii. When writing this I possessed but two male *Abisaras* of this group from the Malay Peninsula, one each represents *A. kausambi* and *A. kausambioides*: from this small material I did not dare to describe a new species.

and quickly get rubbed and worn. All the butterflies of the subfamily keep close to the ground, and rest with half-opened wings.

Family LYCÆNIDÆ.

282. GERYDUS GIGANTES, de Nicéville.

G. gigantes, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 23, n. 19, pl. v, figs. 1, *male*; 13, *female* (1894).

Dr. Martin obtained the type of this species in October, 1892, from the mountains caught by the Battak collector Si-Ketjap, and later on Dr. Martin took several specimens himself at Namoe Oekor in August and November, so this fine and large species probably occurs from the latter place to the Central Plateau. On the wing it greatly resembles some species of *Pierinæ*, and will certainly when flying be always taken by collectors for an insect of that subfamily. It is found also in Penang, and is the largest and most distinct species in the genus. More than half the surface on the upperside in both sexes is pure chalky-white.

283. GERYDUS SYMETHUS, Cramer.

Grose Smith. Hagen. Occurs everywhere from near the sea to the elevation of Namoe Oekor, even near houses, in orchards, and in cocoa-nut plantations. It is common every year at Bindjei in November and December.

284. GERYDUS GALLUS, de Nicéville.

G. gallus, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 25, n. 21, pl. v, fig. 11, *female* (1894).

The figure of this species has not been well reproduced, the ochreous and ferruginous mottlings of the underside not being shewn at all. The white band on the upperside of the forewing is also shewn too narrow. It differs from *G. symethus*, Cramer, in many particulars, but chiefly in having no whitish colour within the oblique discal white band on the upperside of the forewing, whereas in *G. symethus* the base of the wing up to the discal band is bluish-grey instead of brown. It is rare near Selesseh, but is more plentiful in the lower hills and outer spurs of the mountains.

285. GERYDUS BIGGSII, Distant.

The *G. gopara*, de Nicéville, is probably the same species. It is nearly as common as *G. symethus*, Cramer, but is found at a higher elevation, from Namoe Oekor to Bekantschan.

286. *GERYDUS ZINCKENII*, Felder.

I possess one female example from Sumatra which agrees with typical Javan specimens of this species. It may be known by the white area of the forewing on the upperside occupying half the surface, its outer edge straight; in *G. symethus*, Cramer, and *G. gallus*, de Nicéville, the pure white area is much smaller, and is confined to the disc, not reaching the base of the wing, with its outer edge very irregular.

287. *GERYDUS GÆTULUS*, de Nicéville.

G. gætulus, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 24, n. 20, pl. v, fig. 12, female (1894).

On the upperside the forewing is precisely similar to that of *G. zinckenii*, Felder, but the hindwing differs in that instead of being dull fuscous throughout, half the surface is white, with a prominent fuscous disco-cellular line. On the underside it hardly differs from *G. biggsii*, Distant. It is rare, I have seen three females only taken in July and October near Bekantschan.

288. *GERYDUS BOISDUVALI*, Moore.

Very rare, I possess one female only from Sumatra, which is certainly this species.

289. *GERYDUS GÆSA*, de Nicéville.

G. gæsa, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. 26, n. 10, pl. S, fig. 16, male (1895).

May be known from all the described species in the genus by the upperside being immaculate in both sexes. The underside is very similar to that of *G. biggsii*, Distant. It is found from Bekantschan to the Central Plateau in January, March and July.

290. **GERYDUS ZYMNA*, Doubleday and Hewitson.

Grose Smith as *Miletus zymna*. The type of the genus *Miletus* is "*Papilio*" *polycletus*, Linnæus, from the Moluccas. Mr. Druce has monographed the genus in Trans. Ent. Soc. Lond., 1891, p. 179, but unfortunately uses the name *Hypochrysops*, Felder, for it, of which "*Thecla*" *anacletus*, Felder, also from the Moluccas, has been fixed by Mr. Scudder as the type, and which species is congeneric with *Miletus polycletus*. I may note here that a female example of *M. cœlisparus*, Butler, described from Nias Island, off the west coast of Sumatra, has been obtained on Penang Hill ("The Crag") by Mr. A. R. Adams, and will almost certainly be hereafter obtained in the island of

Sumatra which lies between Nias and Penang. I may remark also that I wrote blindly in Butt. of India, vol. iii, p. 21, when I suggested that the genus *Miletus* belongs to the *Gerydus* group; at the time of writing I had seen no specimen of true *Miletus*. Previous writers had used *Miletus* and *Gerydus* for *symethus*, Cramer, which led me astray. "*Miletus*" *zymna* would appear to be a true *Gerydus*, but as it was described from Ashanti, is not likely to be found also in Sumatra. The nearest Sumatran species to which it is superficially allied is *G. gætulus*, de Nicéville.

291. PARAGERYDUS HORSFIELDI, Moore.

Grose Smith as *horsfeldi* [sic]. Hagen. Very common everywhere over the whole of our area. Very variable in size, some females being much smaller than the average of males. Also variable in the coloration of the underside, some Sumatran specimens approach very closely to *P. taras*, Doherty, from Burma, but none of them have "the apex [of the forewing so] widely tinged with rufous-brown" as in that species.

292. PARAGERYDUS PANORMIS, Elwes.

Allotinus panormis, Elwes, Proc. Zool. Soc. Lond., 1892, p. 619, pl. xliii, figs. 8, male; 9, female.

Rare, but occurs at Bekantschan in February, August, September and November, so probably generation follows generation at short intervals. May be recognised at once by the apex of both wings on the underside being greatly infuscated. I have placed it in the genus *Paragerydus* rather than *Allotinus*, as it has the upper discoidal nervule of the forewing originating well beyond instead of at the apex of the discoidal cell.

293. PARAGERYDUS PÆTUS, de Nicéville.

P. pætus, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 269, n. 7, pl. O, fig. 12, male (1895).

A very distinct species from Bekantschan and at higher elevations. Flies in February, March, and again in November.

294. PARAGERYDUS PORTUNUS, de Nicéville.

P. portunus, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 27, pl. v, fig. 14, male (1894).

The very dark colour of the underside will suffice to distinguish this species; Sumatran specimens are even darker than typical ones from Java, the ground-colour being pale ferruginous instead of pale ochreous, with dark ferruginous mottlings. Is commoner than the

preceding species in May and September in the same localities. All species of *Gerydus* and *Paragerydus* are shade-loving butterflies, and never venture into the direct rays of the sun. With the exception of the three common species, *G. symethus*, Cramer, *G. biggsii*, Distant, and *P. horsfieldi*, Moore, they are only found in deep forest, mostly restlessly flying round the buds of not very high bushes. They are rather weak on the wing, but disappear immediately in the forest if pursued. Both genera can be instantly distinguished by the structure of the legs in both sexes, and both possess three or four minute whitish or ochreous spots on the costa of the forewing on the upperside. These are very prominent in *P. pætus*, de Nicéville, and *P. horsfieldi*, Moore, less so in *P. panormis*, Elwes, and just visible only in *P. portunus*, de Nicéville.

295. *ALLOTINUS NIVALIS*, Druce.

Occurs throughout the year in forest near Selesseh, but is rather rare.

296. *ALLOTINUS ALKAMAH*, Distant.

Distant. Found from Namoe Oekor to the Central Plateau, but is always rare. I do not yet possess specimens of *A. subviolaceus*, Felder, from Java, to compare with Burmese, Malayan Peninsula and Sumatran specimens of *A. alkamah*. It is I think probable that the latter is only a synonym of the former.

297. *ALLOTINUS APUS*, de Nicéville.

A. apus, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. 27, n. 11, pl. S, fig. 17, female (1895).

Two female specimens only have been obtained at Bekantschan in February, 1894.

298. **ALLOTINUS MAJOR*, Felder.

Hagen. Originally described from Celebes. We have not seen any species from Sumatra agreeing with Felder's description and figure. It is probable that Dr. Hagen identified *A. apus*, de Nicéville, with this species, as superficially they are somewhat similar.

299. *LOGANIA MALAYICA*, Distant.

Originally described from Sungei Ujong in the Malay Peninsula.

300. *LOGANIA SRIWA*, Distant.

Originally described from Malacca in the Malay Peninsula.

301. *LOGANIA MARMORATA*, Moore.

Originally described from Elphinstone Island in the Mergui Archipelago of Lower Burma.

302. *LOGANIA LUCA*, de Nicéville.

L. luca, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 28, n. 24, pl. ii, fig. 13, female (1894).

Found in Burma (Rangoon, the Daunat Range and Ataran Valley in Tenasserim), in the Malay Peninsula (Perak), and in Sumatra. This is the species referred to by Doherty under *Logania massalia* in Journ. A. S. B., vol. lx, pt. 2, p. 37, n. 10 (1891), as being undescribed from Perak. The general colour of the ground on the underside is brownish-ochreous or pale ferruginous. The figure has been badly reproduced, as it shews the apex of the forewing far too acute.

303. *LOGANIA MASSALIA*, Doherty.

Described from Margherita in Upper Assam. I possess specimens from the Daunat Range in Tenasserim, Burma, from Singapore captured by Dr. Martin, and from Sumatra and Java. The ground-colour of the underside is quite different to that of *L. luca*, de Nicéville, being white speckled with blackish and ochreous, instead of pale ferruginous. The males of both these species have a small round white spot in the middle of the disc of the forewing on the upperside, the hindwing throughout concolorous with the forewing, both being dull purplish-fuscous. A list of the known species of the genus will be found in Journ. A. S. B., vol. lxiii, pt. 2, p. 29 (1894). The *Loganias* are true inhabitants of large forest, and fly like *Gerydus* round the buds of low bushes, but are decidedly quicker on the wing than they. *L. malayica*, Distant, and *L. sriwa*, Distant, occur all the year round in the forests of the plains, and do not go much higher than Namoe Oekor. Both species remind one when flying of a common lycænid, such as *Cyaniris* or *Catochrysops*. *L. marmorata*, Moore, *L. luca*, de Nicéville, and *L. massalia* are found at higher elevations beginning with Namoe Oekor, and occur mostly in the first months of the year, January and February. In 1893 and 1894 Dr. Martin caught a pair of *L. marmorata* in coitû in January in the forest south of Namoe Oekor. The white patch on the upperside of the forewing not reaching the base of the wing will at once separate *L. massalia* from *L. marmorata* and *L. luca*.

304. *ZARONA PHARYGOIDES*, de Nicéville.

Z. pharygoides, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. v, p. 208, pl. E, fig. 3, male (1890).

The type specimen was from Johore in the Malay Peninsula. Dr.

Martin obtained only two males of this rare species at Bekantschan in March and May.

305. *PORITIA SUMATRÆ*, Felder.

Felder. Butler. Grose Smith. Kirby. Distant. Originally described from Sumatra. A very distinct and easily recognised species which shews but little variation. Occurs in the Battak mountains.

306. *PORITIA ERYCINOIDES*, Felder.

Grose Smith. Hagen. Felder originally described and figured a male from Java, Hewitson described and figured the female as *P. phratica* from Singapore, the latter being black on the upperside marked with orange. I have a good series of both sexes from Java, which agree with Sumatran ones from the Battak mountains.

307. *PORITIA PLEURATA*, Hewitson.

The type of this species was from Singapore. The male may be known from *P. erycinoides*, Felder, by having the apical half of the forewing on the upperside black and unmarked instead of heavily marked with blue. The female of *P. pleurata* is marked with blue in some lights, green in others. Occurs in Sumatra at Bekantschan.

308. *PORITIA PROMULA*, Hewitson.

Originally described from a female from Java. Dr. Martin possesses female specimens which agree very well with Hewitson's figures and description.

309. *PORITIA PHILOTA*, Hewitson.

Hewitson. Grose Smith. Kirby. Originally described from Sumatra, where it occurs at Selesseh and in the Battak mountains. It is found also at Pahang and Johore in the Malay Peninsula. The female is unknown. The male is easily distinguished by the very dark colour of the underside, Mr. Hewitson calls it "rufous-brown, undulated throughout with paler colour." I would describe the ground-colour as fuscous, the macular bands very close together, dark ferruginous in colour, outwardly defined with black.

310. *PORITIA PLATENI*, Staudinger.

P. plateni, Staudinger, *Iris*, vol. ii, p. 104, pl. i, fig. 8, male (1889).

Originally described from two males from Palawan in the Philippine Isles. It is a most distinct species, all the bands of the underside present in every *Poritia* are in this species broken up into well-separated spots. The *Poritias* in the male sex have perhaps on the

upperside the most brilliant coloration of all the oriental *Lycænidæ*. They are forest animals, and appear very early in the day as soon as the sun has dried the leaves of the higher bushes or small trees, on which they settle for the sunny tropical forenoon, leaving their favourite perch for a high flight from time to time, but always returning to the same spot. They may be found on the wing before seven o'clock in the morning, but disappear at noon, after which hour they are never seen. In Sumatra *L. erycinoides*, Felder, and *L. pleurata*, Hewitson, are found in the plains, the other species are caught on the outer ranges of the hills from Namoe Oekor to Soengei Batoe. No species is really common, though *P. sumatræ*, Felder, and *P. philota*, Hewitson, are somewhat less rare than the others. They fly all the year round, but are more common from June to August. The females of all the species are very scarce and are seldom seen in collections. A Battak collector in Dr. Martin's service named Similir was particularly clever in getting *Poritias*, and obtained nearly all the specimens in Dr. Martin's collection. He asked for a pair of forceps to reverse without damage the wings of those specimens which died "inside out" as it is often the annoying habit of many small butterflies to do.

311. SIMISKINA PHALENA, Hewitson.

S. phalena, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 270, n. 8, pl. O, fig. 23, female (1895).

Originally described from a male from Singapore; it occurs also in the Patkoi Hills of Upper Assam (= *Massaga hartertii*, Doherty), the Katha District of Upper Burma, and in N.-E. Sumatra, taken at Toentoengan in the compound of Dr. Martin's house by Lieut. Ernst Hartert. I have described and figured the female. Dr. Martin obtained a second male specimen in May, 1894, from the Battak mountains.

312. SIMISKINA PHARYGE, Hewitson.

S. pharyge, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. vi, p. 361, n. 12, pl. F, fig. 11, female (1891).

Originally described from a male from Borneo, I figured and described the female. It occurs also at Perak and Penang in the Malay Peninsula; at Renong in Western Siam; and Herr M. Ude, Dr. H. Dohrn's collector, obtained a pair at Bohorok in Eastern Sumatra, in September, 1894.

313. SIMISKINA PAVONICA, de Nicéville.

S. pavonica, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. 28, n. 12, pl. S, fig. 18, male (1895).

Near to *S. pediada*, Hewitson, from Mergui in Lower Burma and from Singapore. Found in the Battak mountains of Sumatra very rarely.

314. *SIMISKINA PROXIMA*, de Nicéville.

S. proxima, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. 29, n. 13, pl. S, figs. 19, male; 20, female (1895).

Near to *S. potina*, Hewitson, from Burma and the Malay Peninsula. A single pair of this species is in Dr. Martin's collection, the male obtained by Herr Ude at Bohorok in Eastern Sumatra in September.

315. *SIMISKINA PROCOTES*, de Nicéville.

S. procotes, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. 32, n. 14, pl. S, fig. 21, female (1895).

Near to *S. potina*, Hewitson, from Burma and the Malay Peninsula. Described from a single female taken in July at Bekantschan. The remarks regarding *Poritia* given above apply equally well to the genus *Simiskina*. With the exception of *S. proxima*, de Nicéville, of which Dr. Martin took a female in April, 1890, very near the sea at the Saentis Estate, all occur in the outer mountains higher than Namoe Oekor. All the species are very rare, but appear to occur more frequently from June to August.

316. *PITHECOPS HYLAX*, Fabricius.

Snellen as *Plebejus* [sic] *hylax*. Hagen. Staudinger. In large forest, also wherever a small piece of jungle is left in young forest, will *P. hylax* be found flying so quickly that the eye of the collector cannot always follow the little animal. In shadow it is soon lost to view, but becomes visible again when passing one of the errant sunbeams of the forest. It prefers low elevations and occurs throughout the year.

317. *PITHECOPS MARIÆ*, de Nicéville.

P. mariæ, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 30, n. 26, pl. iv, figs. 2, male; 9, female (1894).

Occurs from Namoe Oekor to the Central Plateau where *P. hylax*, Fabricius, is no longer found. Dr. Martin obtained the types in September, 1893, from Bekantschan. It is nearly allied to, but quite distinct from, *P. fulgens*, Doherty, from Margherita in Upper Assam, the only other species in the genus yet known which has the male of a brilliant blue on the upperside. When flying in the sun it looks like a sapphire taken to wings.

318. **PITHECOPS DIONISIUS*, Boisduval.

Grose Smith. This species is, as far as I know, confined to the Papuan region.

319. *UNA USTA*, Distant.

HABITAT: Cachar; Myitta and the Daunat Range, Tenasserim, Burma; the Malay Peninsula; N.-E. Sumatra.

EXPANSE: ♀, .95 of an inch.

DESCRIPTION: FEMALE. UPPERSIDE, *forewing* with the costa, apex, and outer margin broadly brown, the posterior half of the discoidal cell to the inner margin delicate cerulean-blue, which becomes slightly darker towards the base of the wing. *Hindwing* brown, with the exception of a linear spot in the outer half of the discoidal cell, which is covered with bluish scales. UNDERSIDE, *both wings* as in the male, only somewhat paler. *Cilia* grey-brown. *Abdomen* on the underside yellowish-white.

Found in Sumatra at Bekantschan and in the Battak mountains from whence the unique female described above in Dr. Martin's collection was captured in December, 1894. It is never common, but is more plentiful on the river banks at Soengei Batoe in August and September than elsewhere.

320. *NEOPITHECOPS ZALMORA*, Butler.

To the synonyms of this species already given in Butt. India, vol. iii, p. 53 (*Pithecops dharmā*, Moore; *Parapithecops gaura*, Moore; and *Neopithecops horsfieldi*, Distant), may now be added *Cupido talmora* Druce, Proc. Zool. Soc. Lond., 1873, p. 348, n. 4, from Borneo (this species appears to be a MS. name of Mr. Butler's which was never published), and *Plebeius lucifer*, Röber, Iris, vol. i, p. 61, pl. iv, fig. 5 (1888), from the Aru and Key Isles, of which Herr Röber has kindly sent me a specimen from Aru. In Sumatra it is found over our whole area, in the plains (Stabat) and in the mountains (Bekantschan), but is never as common as *P. hylax*, Fabricius. The female, says Dr. Martin, possesses on the upperside of the forewing beyond the discoidal cell a faint blue patch similar to that in the same sex of *P. mariæ*, de Nicéville.

321. *SPALGIS NUBILUS*, Moore.

Originally described from the Andaman Isles. It may be known from the common Indian and Ceylonese *S. epius*, Westwood, by the discal spot on the upperside of the forewing in the male being ochreous instead of whitish; the female of *S. nubilus* is marked like the male, in *S. epius* the female has the disc of both wings on the upperside more or less whitish. *S. nubilus* is also found in Burma, Java, and Borneo. Mr. Moore has incorrectly recorded *S. epius* from Mergui, Lower Burma, the species should be *S. nubilus*, which occurs in Burma as far north

as Chittagong. In Sumatra it is very rare, Dr. Martin has only seen three specimens during his long stay in the island, two taken in October in the forest near Namoe Oekor, and one in forest near Selesseh in January. Perhaps *S. nubilus* escapes being caught by its small size and dull coloration, and by its resemblance to the common *Paragerydus horsfieldi*, Moore.

322. TARAKA HAMADA, Druce.

Rare, found only at higher elevations south of Bekantschan and Soengei Batoe.

323. TARAKA MAHANETRA, Doherty.

Originally described from Padang Rangas, Perak, in the Malay Peninsula. Excessively rare, and found in Sumatra only in the deepest forest. Dr. Martin possesses three specimens, a male from near Selesseh taken in June; and a pair from Bekantschan, the male taken in September, the female in July.

324. MEGISBA MALAYA, Horsfield.

Snellen as *Plebejus* [sic] *malaya*. Hagen. The Sumatran form is typical, the hindwing being tailed. It is not common, but is found all over our area. The males may be captured on small puddles on the forest roads; the females are very rare, and are only met with singly in the forest on flowers and shrubs. Found in Namoe Oekor from July to September.

325. CYANIRIS AKASA, Horsfield.

Grose Smith. Hagen. Not uncommon in the Battak mountains.

326. CYANIRIS COSSÆA, de Nicéville.

C. cossæa, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 271, n. 9, pl. O, figs. 14, *male*; 15, *female* (1895).

Occurs at Namoe Oekor commonly.

327. CYANIRIS CORYTHUS, de Nicéville.

C. corythus, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 273, n. 10, pl. O, figs. 16, *male*; 17, *female* (1895).

Not rare in the Battak mountains in September and December.

328. CYANIRIS PUSPA, Horsfield.

Hagen as *cagaja* [sic]. Snellen as *cagaya*. Sumatran specimens have the merest trace of white sprinkling on the upperside of both

wings in the male, thereby agreeing with *C. lambi*, Distant, from the Malay Peninsula and Nias, and *C. cagaya*, Felder, from the Philippines. I cannot, however, regard *C. lambi* as anything but a synonym of *C. puspa*, that species being very variable, and in the Himalayas embracing a form inseparable from *C. lambi*. *C. cagaya*, Felder, as figured, has the black border to both wings on the upperside somewhat narrower than in Javan specimens of *C. puspa*, from whence it was first described.

329. *CYANIRIS CARNA*, de Nicéville.

C. carna, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 274, n. 11, pl. O, fig. 18, male (1895).

The rarest of all the Sumatran species of the genus. "The infuscation of the costa and apex of the forewing on the underside" is not always present, but the other characters given in the description will suffice to distinguish this species from its allies.

330. *CYANIRIS MUSINA*, Snellen.

C. musina, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 275, n. 12, pl. O, fig. 19, male (1895).

A very common species in Sumatra. I have not been able to obtain typical specimens of this species from Java to compare with Sumatran examples.

331. *CYANIRIS PLACIDA*, de Nicéville.

Not very common in Sumatra.

332. *CYANIRIS CAMENÆ*, de Nicéville.

C. camenæ, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 278, n. 14, pl. O, fig. 22, male (1895).

The commonest species of the genus occurring in Sumatra.

333. *CYANIRIS LIMBATUS*, Moore.

Also common.

334. *CYANIRIS MELÆNA*, Doherty.

Originally described from the Tenasserim Valley, Burma. Very rare in Sumatra, Dr. Martin has obtained two or three specimens only in the Battak mountains. Of the ten Sumatran species of *Cyaniris*, only two occur in the plains, *C. cossæa*, de Nicéville, and *C. puspa*, Horsfield, all the others are found in the mountains at high elevations from Soengei Batoe to the Central Plateau, and on the Plateau itself. *C. akasa*, Horsfield, and *C. corythus*, de Nicéville, are somewhat scarce,

C. carna, de Nicéville, and *C. melæna*, Doherty, are very rare, whilst the four remaining species are very common and brought in by the collectors in large numbers. The males only are caught on wet spots on roads and on the sandy banks of small hill streams; the very scarce females can only be taken in the forest, where they are looking for and ovipositing on the food-plants of the larvæ, or feeding on the flowers of certain *Compositæ*.

335. *CYANIRIS HARALDUS, Fabricius.

Grose Smith as *Lycænopsis ananga*. Distant. Butler. Kirby as *haraldus* and *ananga*. I have never seen this very rare species. Its record from Sumatra is probably correct, so striking a butterfly is not likely to have been wrongly identified. The *Lycænopsis ananga* of Felder is a synonym of *C. haraldus*. I think it probable that the genus *Lycænopsis* is valid, at any rate the type species is a very different-looking animal to all the species of *Cyaniris* known to me.

336. ZIZERA LYSIMON, Hübner.

Hagen as *karsandra*.

337. ZIZERA GAIKA, Trimen.

The rarest species of the genus occurring in Sumatra as elsewhere.

338. ZIZERA OTIS, Fabricius.

Snellen as *lysizone*. Hagen as *lysizone*. All the three *Zizeras* frequent only open grassy spots, and are found near houses and on fallow land. *Z. lysimon*, Hübner, is very common in the plains, and is nearly ubiquitous, especially so on the flowers of a wild species of thorny *Spinacia* (*Amarantus spinosus*, Linnæus), and on the small yellow flowers of a very common species of *Portulaca*. *Z. gaika*, Trimen (named after a Zulu chief, so Mr. Trimen informs me) is found in the same localities, but is very rare; Dr. Martin took it in his garden at Bindjei. *Z. otis* is found on the Central Plateau, and near Battak villages in the mountains.

339. AZANUS ASIALIS, de Nicéville.

A. asialis, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. 33, n. 15, pl. S, fig. 22, male (1895).

Described from a single example caught in the Battak mountains in July, 1894.

340. LYCÆNESTHES EMOLUS, Godart.

Hagen as *Pseudodypsas* [sic] *bengalensis*.

341. *LYCÆNESTHES LYCÆNINA*, Felder.

Both species of this genus inhabit the plains, and do not occur at the higher elevations. They are common in May near Selesseh on forest roads. *L. lycænina* is the rarer of the two species, and Dr. Martin obtained no female of either.

342. *NIPHANDA TESSELLATA*, Moore.

HABITAT: Penang, Malay Peninsula; N.-E. Sumatra.

EXPANSE: ♂, 1.5 inches.

DESCRIPTION: MALE. UPPERSIDE, *both wings* dark shining purple, with a narrow anteciliary black thread. *Hindwing* with a round marginal black spot in the first median interspace. UNDERSIDE, *both wings* marked as in the female, but the ground-colour much darker.

The specimen described above was caught by Dr. Martin in his fingers on the Penang Hill in December, 1892, resting on a flower. In Sumatra he has obtained one female at the Saentis Estate, very near the sea, in April, and a second at Namoe Oekor in August.

343. *EVERES ARGIADES*, Pallas.

Snellen as *parrhasius*. Hagen as *parrhasius*. It has been described by Herr N. Kheil from Nias as *Plebeius polysperchinus*. In Sumatra it is common at low elevations in October and November; as usual the males on roads, the females on flowers in small jungle. In his valuable work on the *Rhopalocera* of Nias Island, Herr Kheil calls *Polyommatus bæticus*, Linnæus, the "*cardui*" of the *Lycaenidæ*, but *E. argiades* better deserves that epithet as it has a still greater range, occurring in North America under a slightly modified form (as *E. comyntas*, Godart), which *P. bæticus* does not do. Dr. Martin notes that European specimens of *E. argiades* have the spots on the underside of the wings somewhat more prominent than in Sumatran examples.

344. *NACADUBA MACROPHTHALMA*, Felder.

Originally described from Pulo Milu, one of the Nicobar Isles.

345. *NACADUBA PAVANA*, Horsfield.

Originally described from Java.

346. *NACADUBA KERRIANA*, Distant.

Originally described from Malacca and Singapore, occurs also in Burma.

347. *NACADUBA* sp.

I possess a single female of a species allied to this group, *i.e.*, it

has the basal area of the forewing on the underside unmarked, while all the species of *Nacaduba* enumerated below have an additional basal striga, while all those above named lack this striga; but as the females of all of them are known, the present species cannot appertain to any of them. I refrain from describing it until I have obtained the opposite sex.

348. *NACADUBA ATRATA*, Horsfield.

Grose Smith. This species = *N. prominens*, Moore.

349. *NACADUBA HERMUS*, Felder.

This species = *N. viola*, Moore, = *P. unicolor*, Röber, *Iris*, vol. i, p. 66, pl. v, fig. 4, *male* (1888), described from East Celebes, Ceram, and the Key Islands, of which Herr Röber has sent me a male from Ceram.

350. *NACADUBA ANCYRA*, Felder.

HABITAT: Amboina (*Felder*); East Pegu (*Elwes*); East and South Celebes, the Aru Isles, Ceram (*Röber*); Palawan; Batjan; Celebes; Cooktown, N.-E. Australia (*Staudinger*); Philippine Isles (*Semper*); S.-E. Borneo, Java, Engano, ? Nicobar Isles (*Doherty*); N.-E. Sumatra; Celebes; Yamna, near Humboldt's Bay, North New Guinea (*coll. de Nicéville*).

EXPANSE: ♀, 1·2 inches.

DESCRIPTION: FEMALE. UPPERSIDE, *forewing* plumbeous; with a large metallic iridescent silvery-blue discal area, which reaches into the posterior half of the discoidal cell, and occupies the base and inner margin of the wing. *Hindwing* plumbeous, but the basal two-thirds overlaid with blue scales; the veins defined with black; the outer margin has a broad black border with its inner edge lunulated between the veins, bearing a series of marginal black spots between the veins, each spot outwardly defined by a fine anteciliary thread, inwardly by a white lunule, except the two larger anal spots which are inwardly crowned with ferruginous; a very fine black anteciliary thread. UNDERSIDE, *both wings* as in the male. *Cilia* white. *Tail* black, tipped with white.

Described from a single example from Sumatra. It has all the appearance of a female of the genus *Catochrysops*, to which genus this species bears a strong superficial resemblance. It has several synonyms, *Nacaduba aberrans*, Elwes, *Proc. Zool. Soc. Lond.*, 1892, p. 626, pl. xlv, fig. 6, *male*; *Plebeius subfestivus*, Röber, *Iris*, vol. i, p. 64, pl. iv, fig. 33, *male* (1888); *Nacaduba pseutis*, Doherty, *Journ. A. S. B.*, vol. lx, pt. 2, p. 182 (1891); and Dr. O. Staudinger and Herr Georg Semper both suggest that the *Cupido almora* of Druce, *Proc. Zool. Soc. Lond.*, 1873, p. 349, n. 14, pl. xxxii, fig. 7, *male*, from Borneo, is also a synonym, which is probably correct, but I cannot

say for certain, as the upperside is alone figured and that very badly, while the description of the underside "Very pale brown, streaked and mottled with white. Hindwing with two black spots at the anal angle as above" is quite inadequate to distinguish the species.

351. *NACADUBA NANDA*, de Nicéville.

N. nanda, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. 34, n. 16, pl. S, fig. 23, *male* (1895).

352. *NACADUBA NELIDES*, de Nicéville.

N. nelides, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 280, n. 16, pl. O, fig. 24, *male* (1895).

353. *NACADUBA NOREIA*, Felder.

Hagen as *nora*. The *Lycæna nora*, of Felder, from Amboina, has tails, and almost certainly equals *N. ardates*, Moore. *N. noreia* is typically tailless, and was described from Ceylon from a female. I have seen the type at Vienna, and it is what I have called the tailless form of *N. ardates*. *N. noreia* occurs typically in Sumatra. What I consider to be its female, and of which we possess many specimens (all of them to my eyes are obviously females, though Dr. Martin disputes the fact, as he says he has taken them sucking up moisture on damp spots on the roads, a habit quite unknown to female *Lycænidæ*, being confined to the males), is very curiously marked on the underside, having the ground-colour ochreous-yellow or luteous, in both wings with a very prominent marginal series of black spots, those in the forewing of equal size throughout, in the hindwing counting from anteriorly backwards the first and the sixth larger than the rest; within this series of spots is another submarginal obscure fuscous series; no basal or discal markings to both wings whatever. Dr. Martin proposes to call this "species" *Nacaduba lutea*, and has described it in a paper published in Munich entitled "Einige neue Tagschmetterlinge von Nordost-Sumatra, pt. 1, p. 1, n. 1 (1895), and I have figured it from a female in Journ. Bomb. Nat. Hist. Soc., vol. x, pl. S, fig. 24 (1895). In Sumatra also occurs typical *N. ardates*, which is tailed. This I hold to be a dimorphic form in both sexes of *N. noreia*. Its female is most variable, some forms of it from Burma in my collection being marked almost exactly as in *N. lutea*, Martin, the basal and discal markings being almost obliterated. I have not seen any females of true *N. ardates* with tails from Sumatra. The *Plebeius kupu*, Kheil, from Nias = *N. ardates*, Moore.

354. *NACADUBA DANA*, de Nicéville.

If the species of *Oyaniris* are more restricted to higher elevations,

the greater number of *Nacadubas* occur in the plains at low elevations. From the Central Plateau *N. nelides*, de Nicéville, alone occurs, while *N. pavana*, Horsfield, and *N. atrata*, Horsfield, are found on the outer hills. All the other species occur in the plains. *N. macrophthalma*, Felder, *N. kerriana*, Distant, *N. nanda*, de Nicéville, *N. nelides*, de Nicéville, and *N. dana* are rare, the rest are more or less common. All *Nacadubas* are very fond of water, the males are usually captured sucking up this element on damp spots; the females are rare in all the species, and never come to water.

355. **NACADUBA PERUSIA*, Felder.

Snellen. Originally described from Amboina. It is quite probable I think that this species will be found to be a synonym of *N. atrata*, Horsfield, which species appears to have been unknown to Dr. Felder.

356. *JAMIDES SIRAHA*, Kheil.

Plebeius siraha, Kheil, Rhop. Nias, p. 30, n. 91, pl. v, fig. 35, male (1884).

Snellen as *Plebejus* [sic] *plato*. Hagen as *bochus*. Originally described from Nias. It is a very distinct species, the male having the lovely metallic steel-blue coloration on the upperside of the forewing reduced to less than half the surface; in *J. bochus*, Cramer, from India and Ceylon, that colour occupies more than two-thirds the surface. *J. siraha* is figured by Distant in Rhop. Malay., p. 222, n. 1, pl. xxi, figs. 19, male; 16, female (1884), as *J. bochus*, var., from Province Wellesley. In Sumatra it is found all over our area, but is rare everywhere. Dr. Martin has specimens taken in February, April, October and November, and he caught a male at the door of his hospital at Bindjei on a flowering creeper (*Pharbitis nil*, Chois.).

357. *LAMPIDES CELENO*, Cramer.

Snellen as *celeno* and *agnata*. Grose Smith. Hagen as *celeno* and *malaccanus*. This species is better known under the name of *L. ælianus*, Fabricius. The *L. malaccanus* of Röber, and *L. agnata* of Druce are both synonyms.

358. *LAMPIDES CLEODUS*, Felder.

Originally described from Luzon in the Philippine Isles. *L. pura*, Moore, described from the Mergui Archipelago in Lower Burma, but which occurs also in Assam, Upper Burma, and Nias Island, is a synonym of *L. cleodus*. In Sumatra it is found at Selesseh and in the Battak mountains.

359. LAMPIDES SATURATA, Snellen.

Lycæna saturata, Snellen, Tijds. voor Ent., vol. xxxv, p. 137, n. 3 (1892).

Originally described from Java, but not figured. I am not quite sure of the identification, it is difficult to identify species of this genus without good figures. It is one of the commonest species of *Lampides* in the Malay Peninsula, Sumatra, and Java; I possess a very long suite of specimens of it from all these places.

360. LAMPIDES TALINGA, Kheil.

Plebeius talinga, Kheil, Rhop. Nias, p. 29, n. 86, pl. v, figs. 32, male; 33, female (1884).

Lampides talinga, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. 39, n. 18, pl. 8, figs. 27, male; 28, female (1895).

A very small and quite distinct species. Originally described from Nias, and is very common in Sumatra.

361. LAMPIDES ELPIS, Godart.

Snellen. Hagen as *elphis* [sic], Godardt [sic].

362. *LAMPIDES KANKENA, Felder.

Snellen. Originally described from Kar Nicobar. I have seen the type specimen, a male, at Vienna. In the Indian Museum, Calcutta, are a pair of specimens from Nankowri, one of the Nicobar Islands, and I possess males from Nias Island and the Philippines. Its occurrence in Sumatra is not at all improbable. It is a very distinct species, has the striæ on the underside arranged as in *L. elpis*, Godart; the male on the upperside is of a very pale silvery-blue.

363. LAMPIDES KONDULANA, Felder.

Originally described from Kondul Isle, one of the Nicobars. I have seen the type in Vienna. In coloration the male is similar to that sex of the three preceding species, but the black border to the wings on the upperside is reduced to a marginal thread. On the underside the striæ are as in the two last-named species. I possess specimens from Nacondam Island, the Nicobar Isles, Burma, the Malay Peninsula, Sumatra and Java. The "*Cupido*" *cærulea*, Druce, from Borneo, Proc. Zool. Soc. Lond., 1873, p. 349, n. 13, pl. xxxii, fig. 6, male, is almost certainly a synonym of this species.

364. LAMPIDES SUBDITA, Moore.

First described from Mergui in Lower Burma. Is not uncommon in Sumatra at Namoe Oekor and in the Battak mountains.

365. LAMPIDES MARGARITA, Martin.

L. margarita, Martin, Einige neue Tagschmetterlinge von Nordost-Sumatra, pt. 2, p. 9, n. 8 (1895).

Occurs very rarely at Bekantschan and in the Battak mountains.

366. *LAMPIDES SUIDAS, Felder.

Hagen. Originally described from Luzon in the Philippines, from whence I possess specimens. We have not obtained it in Sumatra.

367. LAMPIDES BOCHIDES, de Nicéville.

L. bochides, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. vi, p. 367, n. 16, pl. F, fig. 15, male (1891).

Rare, has been obtained at Selesseh and in the Battak mountains.

368. LAMPIDES ABDUL, Distant.

Very rare in the Battak mountains. Originally described from a unique female from Malacca in Dr. O. Staudinger's collection, which I have examined at Dresden. The male, which is of a peculiar shade of metallic green on the upperside, is the *L. marakata* of Doherty, described from Padang Rangas, Perak, Malay Peninsula, in Butt. India, vol. iii, p. 174 (1890).

369. LAMPIDES LUCIDE, de Nicéville.

L. lucide, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 33, n. 29, pl. v, fig. 3, male (1894).

Excessively rare, Dr. Martin has only obtained a few specimens in the Battak mountains, of which four males are in my collection. All the Sumatran *Lampides*, with the exception of one species, are true forest butterflies, which greatly enliven and cheer the gloomy evergreen primeval forests by the vivid and brilliant coloration of their wings. So perhaps they to some extent compensate for the observed poverty of blue flowers in the forest which has been noted by many writers. *L. celeno*, Cramer, like species of *Nacaduba*, *Catochrysops*, *Everes* and many other *Lycænidæ*, is found on wet spots on the roads. *L. lucide*, the most distinct of the Sumatran *Lampides*, occurs only on the Central Plateau. *L. margarita*, Martin, *L. bochides*, de Nicéville, and *L. abdul* [*recte abdula*, and so given in the Index to the plates of Mr. Distant's book] are found at higher elevations, from Bekantschan to the Plateau; while the remaining species are inhabitants of the forests of the alluvial plain. *L. celeno*, *L. saturata*, Snellen, *L. talinga*, Kheil, *L. elpis*, Godart, and *L. kondulana*, Felder, are common; *L. subdita*, Moore, *L. cleodus*, Felder, and *L. bochides* are scarce; while *L. margarita*, *L. abdul*, and *L. lucide* are very rare.

All the *Lampides* are very restless and quick on the wing, and never settle for a long time, consequently from the denseness of the plant-growth in the forest are not easily captured.

370. CATOCHRYSOPS STRABO, Fabricius.

Hagen as *strabo*, Fabricius [sic] and *kandarpa*. Staudinger as *kandarpa*. The *C. kandarpa* of Horsfield is a synonym of *C. strabo*.

371. CATOCHRYSOPS LITHARGYRIA, Moore.

First described from Ceylon, but found also in Assam, Burma, the Andaman Isles, and the Philippine Isles.

372. CATOCHRYSOPS CNEJUS, Fabricius.

Snellen. The three species of *Catochrysops* in Sumatra occur at the lower elevations, and are not found higher than Bekantschan. The males of *C. strabo*, Fabricius, and *C. lithargyria*, Moore, are very common on roads, where they act as miniature scavengers, but the females must be sought for in gardens or small jungle. The males of *C. strabo* in particular occur in large numbers, thirty to fifty specimens, on the margins of puddles, and form beautiful violet patches of colour on the sunny roads. *C. lithargyria* is a little rarer than *C. strabo*, and may be considered to be a good species, Dr. Martin noting that he possesses females probably of this species which differ slightly in the shade of blue on the upperside of both wings from undoubted females of *C. strabo*. *C. cnejus* is quite as common as *C. strabo*, but is seldom found on roads as it prefers gardens in which the common Chinese bean (*Vigna sinensis*, Savi.) is cultivated, on the flowers of which the larva feeds. The figures of *C. strabo* and *C. cnejus* in Distant's Rhop. Malay. are not good, being far too reddish in shade on the upperside. The widely distributed *C. pandava*, Horsfield, which is common at Singapore, and is the most plentiful of all the Nicobarese butterflies, is strangely enough apparently absent from Sumatra.

373. CASTALIUS ROSIMON, Fabricius.

Grose Smith. Hagen.

374. CASTALIUS ANANDA, de Nicéville.

First described from Sikhim, occurs also in Assam, Upper Burma, Orissa, and South India.

375. CASTALIUS ETHION, Doubleday and Hewitson.

Grose Smith. Snellen. Hagen. Distant.

376. *CASTALIUS ROXUS*, Godart.

Hagen as *roxus*, Godardt [sic]. Staudinger.

377. *CASTALIUS ELNA*, Hewitson.

Widely distributed, found in North-Eastern and Southern India, Burma, the Andaman Isles, the Malay Peninsula, and Java. *C. rosimon*, Fabricius, *C. ethion*, Doubleday and Hewitson, *C. roxus*, Godart, and *C. elna* occur in the plains and outer hills south of Bekantschan and Bohorok. *C. rosimon*, *C. roxus*, and *C. elna* are found on roads and grassy places such as forest tracts overgrown with high grass, and settle with folded wings on the ground if moist, or on the tops of flowering *Gramineæ*. *C. ethion* keeps more to low shrubs, and is found inside the forest. *C. ananda*, de Nicéville, is only found in the forest on certain bushes in February and March. Dr. Martin took it, also in March and April, at Singla below Darjiling in the Western Himalayas only on certain trees, but I have caught the male in the same place on the wet sand in the beds of streams. The female of *C. ethion*, which has no blue coloration on the upperside of both wings, is so far quite similar to the male of *C. roxus*, our most common species, but the markings of the underside will instantly distinguish them. *C. elna*, the largest of our *Oastalius*, is decidedly rarer than *C. rosimon*, *C. ethion*, and *C. roxus*; *C. ananda* is the rarest of all, and found only at the higher elevations.

378. *POLYOMMATUS BÆTICUS*, Linnæus.

Snellen. Hagen. Distant as *bæticus* [sic]. This widely-spread butterfly occurs in Sumatra near the sea, as Dr. Martin has taken it at the Saentis Estate and at Loboë Dalam on the flowers of the common kidney bean (*Phaseolus vulgaris*, Linnæus), and also very high in the mountains at Soengei Batoë and on the Central Plateau, but it is never found in the intermediate area. Dr. Martin is quite unable to account for this fact, which has also been observed by Dr. Hagen, who has taken *P. bæticus* near Laboëan on abandoned Indigo plants, and believes that the butterfly was imported to this very low elevation from Singapore when the Malays first introduced the Indigo plant from thence.

379. **CUPIDO ÆTHERIALIS*, var.

Hagen. I am unable to trace this species.

380. **LYCÆNA AUGUSTA*.

Grose Smith. I have failed to discover this species also.

381. *LYCÆNOPSIS CYLINDE, Boisduval.

Grose Smith. Originally described from Dorei, New Guinea. Unless the type of this species still exists in M. Charles Oberthür's collection, it will be impossible to identify it from Boisduval's short description.

382. AMBLYPODIA NARADA, Horsfield.

Hagen. Grose Smith as *anita*. The *A. anita* of Hewitson was originally described from Siam, and is the common Indian and Ceylonese species. The coloration of the male on the upperside of both wings is more purple than blue, and it is not found south of Burma. *A. narada* is rich deep blue, and occurs in the Malay Peninsula. In Sumatra it is by no means common in the forests of the plains, and Dr. Martin possesses other specimens from Asahan and Indragiri. Dr. Martin notes that he has some very small examples of both sexes with a broader brown margin to the upperside of the forewing, and the markings of both wings on the underside more prominent, than in typical specimens.

383. IRAOTA ROCHANA, Horsfield.

Originally described from Java. The *I. boswelliana* of Distant, described from Penang and Singapore, is a synonym of this species. Dr. Martin remarks that the male has three tails. As figured by Horsfield and Moore in Cat. Lep. Mus. E. I. C., vol. i, p. 44, n. 68, pl. ia, fig. 10, *male* (1857), there are only two.

384. IRAOTA NILA, Distant.

HABITAT: Malacca (*Distant*); N.-E. Sumatra.

EXPANSE: ♂, 1.4 to 1.6 inches.

DESCRIPTION: MALE. UPPERSIDE, *both wings* black, with rich purple markings. *Forewing* with a streak occupying the middle of the discoidal cell for its whole length; two short streaks in the median interspaces, a very large one in the submedian interspace bisected by the submedian fold, not reaching the outer margin; a short streak at the base of the sutural area. *Hindwing* with the disc purple divided by the black veins; the costa and abdominal margin rather broadly pale fuscous; *tails* two, of equal length, short, narrow, black tipped with white. UNDERSIDE, *both wings* coloured and marked as in the female. *Antennæ* black, the tip of the club above gamboge-yellow, beneath also of the same colour, but gradually merging into the ferruginous colour of the middle and base of the club. *Head* with two white lines across the face, the orbits white. *Palpi* with the apex black, the base white. *Abdomen* above black, beneath whitish.

After all, this species turns out to be a true *Iraota*, though it is somewhat aberrant, as both sexes have two tails (in *I. rochana* the male has two [Dr. Martin says three] and the female three tails; in *I. timoleon*, Stoll, and allies the male has one and the female two tails), and the shape of the wing differs also somewhat from typical *Iraotas* in both sexes. The neururation, however, is quite normal. In Sumatra both the species of *Iraota* are rare, the males even more so than the females. Dr. Martin took the first male of *I. rochana*, Horsfield, a very large specimen, measuring 1·7 inches, at Namoe Oekor in August, 1892, and the first male of *I. nila* near Bekantschan in October, 1893. We have other specimens taken at Selesseh in July, and in the Battak mountains in September.

385. SURENDRA AMISENA, Hewitson.

Grose Smith. Hagen.

386. SURENDRA FLORIMEL, Doherty.

Originally described from Lower Burma.

387. *SURENDRA VIVARNA, Horsfield.

Hagen. Originally described from Java, from whence I have a good series of both sexes. *S. amisena*, Hewitson, and *S. florimel*, Doherty, both occur at low elevations in the forests of the plains, the former is very common near Selesseh, the latter much rarer. The males of the two species must be differentiated by the markings of the under-side of the wings. In habits they resemble those of the following genus.

388. ARRHOPALA CENTAURUS, Fabricius.

Butler. Distant. Occurs in the sultanate of Indragiri.

389. ARRHOPALA AGNIS, Felder.

Grose Smith. Hagen. The shade of coloration of the upper-side of the male is more variable in this species than in any other known to me; in some specimens it is almost pale blue, and there is nearly every gradation to be met with till deep purple is reached completing the series. It is a common species, and is found in Burma, the Malay Peninsula, and Nias; in Sumatra it occurs at Selesseh and in the Battak mountains.

390. ARRHOPALA ACE, de Nicéville.

A. ace, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. vii, p. 329, n. 6, pl. H, fig. 13, *male* (1892).

Originally described from Perak in the Malay Peninsula. I possess

a single example from the Battak mountains of Sumatra. It is a very distinct and easily recognised species.

391. *ARRHOPALA ADOREA*, de Nicéville.

A common species at Bekantschan and in the hills.

392. *ARRHOPALA ATOSIA*, Hewitson.

Hewitson. Hagen. Grose Smith. Butler. Kirby. Distant. Originally described from Sumatra. A common and easily recognised species.

393. *ARRHOPALA AMPHEA*, Felder.

Originally described from Luzon in the Philippines. It is near to *A. abseus*, Hewitson, but the male may be known from the same sex of that species by having the purple coloration of both wings on the upperside nearly twice as extensive.

394. *ARRHOPALA AROA*, Hewitson.

Hewitson. Grose Smith. Butler. Kirby. Distant. Originally described from Sumatra, and is probably the commonest species of the genus found in the island.

395. **ARRHOPALA ATRAX*, Hewitson.

Grose Smith. Probably incorrectly identified, as it is strictly confined to India as far as I am aware.

396. *ARRHOPALA ADATHA*, Hewitson.

A fairly common species in Sumatra.

397. *ARRHOPALA PSEUDOMUTA*, Staudinger.

Amblypodia pseudomuta, Staudinger, Iris, vol. ii, p. 125 (1889).

Arhopala rafflesii, de Nicéville, Butt. India, vol. iii, p. 248, n. 803, pl. Frontispiece, fig. 136, male (1890).

I possess only one specimen of this species from Sumatra.

398. **ARRHOPALA AGESILAUS*, Staudinger, var. *MAJOR*, Staudinger.

Amblypodia agesilaus, Staudinger, var. *major*, Staudinger, Iris, vol. ii, p. 128 (1889).

Staudinger. Described typically and figured (*l. c.*, pl. i, fig. 17, male) from Palawan in the Philippine Isles, and the var. *major* from Malacca and Fort de Kock in Sumatra. It appears to be very close to *A. pseudomuta*, Staudinger. We have failed to recognise it.

399. *ARRHOPALA ANUNDA, Hewitson.

Grose Smith. Originally described from Borneo, but unknown to us.

400. ARRHOPALA TEESTA, de Nicéville.

Found at Selesseh and in the Battak mountains. It occurs in Java as well as in India, and may be the same species as *A. turbata*, Butler, from Japan.

401. ARRHOPALA APIDANUS, Cramer.

Grose Smith. Distant. Not rare. As usual with this species, the female in Sumatra is more frequently met with in collections than the male.

402. ARRHOPALA DIARDI, Hewitson.

Grose Smith as *capeta*. Found in the Battak mountains. The "*Amblypodia*" *capeta*, Hewitson, described from Sumatra, is the female of *A. diardi*, of which Hewitson described the male only. The species has a wide range, being found in Assam, Siam, the Malay Peninsula, Sumatra, and Java.

403. ARRHOPALA AZINIS, de Nicéville.

A. azinis, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. , n. 20, pl. T, fig. 31, *male* (1896).

Described from a single male in Dr. Martin's collection taken at Bekantschan in March, 1894.

404. ARRHOPALA AZATA, de Nicéville.

A. azata, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. , n. 21, pl. T, figs. 32, *male*; 33, *female* (1896).

Occurs also in Perak in the Malay Peninsula; in Sumatra it has been taken in March, July, and November.

405. ARRHOPALA ANTHELUS, Doubleday and Hewitson.

This fine species occurs at Selesseh in Sumatra, and I possess specimens also from Java. The males from Sumatra are of a deeper shade of blue on the upperside of both wings than typical specimens from Burma, while Javan specimens are normally coloured.

406. *ARRHOPALA ANARTE, Hewitson.

Hagen. Grose Smith as *anartes* [sic]. Kirby. Distant. This species doubtless occurs in Sumatra, though we have never met with it. It is found in Burma, the Malay Peninsula, and Borneo.

407. **ARRHOPALA AUXESIA*, Hewitson.

Hewitson. Kirby. Originally described from Sumatra, but we have not met with this fine species. *A. auzea*, de Nicéville, from Java, is a local race of *A. auxesia*.

408. *ARRHOPALA BUXTONI*, Hewitson.

Hewitson. Grose Smith. Staudinger. Distant. Originally described from Sumatra, where it is found at Selesseh.

409. *ARRHOPALA FARQUHARI*, Distant.

Snellen as *eumolphus*. Hagen as *eumolphus*. Grose Smith as *eumolphus*. The *A. eumolphus* of Cramer was described from the Bengal Coast, so it appears best to retain that name for the Eastern Himalayan, Assamese, and Chittagong Hill Tracts form. Its female is the *A. bupola* of Hewitson. The female of *A. farquhari* is probably the *A. maxwelli* of Distant. Snellen suggests that *A. atosia*, Hewitson, is the female of the Sumatran form; in this I cannot agree with him, *vide* Butt. India, vol. iii, p. 242. I possess a long series of *A. adonias*, Hewitson, from Java from whence it was originally described. All my specimens appear to be females, and as the markings of the underside agree closely with those of *A. eumolphus*, *A. farquhari*, *A. hellenore*, Doherty, and *A. horsfieldi*, Pagenstecher, I am inclined to believe that its male is a green species which does not appear to differ at all from the same sex of *A. farquhari*, though the Javan female (true *A. adonias*) is of quite a different shade of colour on the upper-side of both wings, being a pale silvery blue, to the deep purple coloration of the female of the true *A. farquhari* from Burma, the Malay Peninsula, Sumatra, and Borneo. In Sumatra *A. farquhari* is found at Bekantschan and in the Battak mountains.

410. *ARRHOPALA TROGON*, Distant.

Originally described from Perak in the Malay Peninsula. Very rare in both sexes, but the female seems to be more often met with than the male.

411. *ARRHOPALA HORSFIELDI*, Pagenstecher.

Amblypodia horsfieldi, Pagenstecher, Jahr. des Nass. Ver. für Naturk., vol. xliii, pp. 99, 106 (1890).

Arhopala basiviridis, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. vi, p. 373, n. 21, pl. G, fig 22, male (1891).

Originally described from East Java by Pagenstecher, and from the Malay Peninsula and Borneo by myself. In Sumatra it is found in the Battak mountains.

412. *ARRHOPALA ANNIELLA*, Hewitson.

Originally described from Singapore from a male. From superficial appearances only one would say that the *A. artegal* of Doherty from Mergui in Lower Burma is a synonym of this species. Against this is the fact that Doherty described his species from two male specimens, while the description and figure agrees with the female of *A. anniella*. In Sumatra *A. anniella* occurs in the Battak mountains.

413. *ARRHOPALA SINGHAPURA*, Distant.

Originally described from Singapore. Dr. Martin writes to me that he possesses this species from Sumatra, that it is a good species, and is very different from *A. anniella*, Hewitson, as it has a blunt and broad tail tipped with white, and is a smaller insect. On the underside *A. anniella* has white scales which are entirely wanting in *A. singhapura*, of which also the metallic green markings near the anal angle of the hindwing are largely different and more prominent, also shaped differently to those in *A. anniella*. The markings on the underside of *A. singhapura* are also much nearer to those of *A. diardi*, Hewitson, than to those of *A. anniella*. Till I received this note from Dr. Martin I thought that *A. singhapura* might be a synonym of *A. anniella*, Distant having figured the female of the former and the male of the latter.

414. **ARRHOPALA INORNATA*, Felder.

Grose Smith. I have failed to recognise this species from any locality.

415. **ARRHOPALA PERIMUTA*, Moore.

Grose Smith. This is a very distinct and easily recognised little species, and Mr. Grose Smith is not likely to have wrongly identified it. I have no record except the above of its occurrence south of Mergui in Lower Burma.

416. *ARRHOPALA MORPHINA*, Distant.

Very rare, found in the Battak mountains only. It is one of the most beautiful and distinct species in the genus, and was originally described from Perak in the Malay Peninsula.

417. *ARRHOPALA OVOMACULATA*, Hewitson.

Originally described from Sumatra. It occurs in the Battak mountains rarely in August.

418. *ARRHOPALA AGESIAS*, Hewitson.

Grose Smith. Originally described from Borneo. I possess one example only from Sumatra. Hewitson describes four discal spots on the underside of the forewing, but he figures five, while my specimen has six.

419. *ARRHOPALA ANILA*, de Nicéville.

A. anila, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. , n. 22 (1896).

I have thus named the variety *a* of Hewitson's *A. agesias*, as I see no reason why it should not be a quite distinct species. It occurs in the Malay Peninsula, at Namoe Oekor in Sumatra in August, and in Borneo.

420. *ARRHOPALA METAMUTA*, Hewitson.

Grose Smith. Butler. Kirby. Distant. Originally described from Sumatra, where it does not appear to be at all a common species.

421. *ARRHOPALA HYPOMUTA*, Hewitson.

Grose Smith. If I have correctly identified this species, it is common in Sumatra.

422. *ARRHOPALA AMPHIMUTA*, Felder.

Hagen. I possess one male specimen from Sumatra, which I identify a little doubtfully as this species.

423. *ARRHOPALA ANTIMUTA*, Felder.

Snellen. A common species. It has no tail, and is easily recognised from *A. atosia*, Hewitson, which is tailed, by this feature. Both species have a patch of differently-formed scales in the middle of the forewing on the upperside in the male.

424. *ARRHOPALA DAVISONII*, de Nicéville.

A very common species in Sumatra as elsewhere.

425. *ARRHOPALA AVATHA*, de Nicéville.

A. avatha, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. , n. 23, pl. T, fig. 34, *male* (1896).

Differs from *A. davisonii*, de Nicéville, in having the black margin to both wings on the upperside in the male twice as broad.

426. *ARRHOPALA ASIA*, de Nicéville.

Arrhopala asia, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. vii, p. 333, n. 9, pl. H, fig. 16, *male* (1892).

Originally described from the Malay Peninsula. I possess several male specimens from Sumatra which agree with the type.

427. *ARRHOPALA (Acesina) AMMON*, Hewitson.

Originally described from Singapore. Occurs in Sumatra in the Battak mountains.

428. *ARRHOPALA (Mahathala) AMERIA*, Hewitson.

Hagen. Not uncommon; as usual, the females are more often met with than the males. This genus is the one most largely represented in Sumatra, which may perhaps be its head quarters, though the Malay Peninsula may possibly possess quite as many species. All are found in forests, but nevertheless their more or less metallic blue, purple, and green colours are not at all conspicuous and they do little to enliven the somber depths of the forest, as the restless species of *Lampides* do. *Arrhopalas* never come to small streams or damp spots on roads to suck up the moisture, or to flowers, they hardly ever fly unless disturbed, and as they always settle with folded wings, of which the undersides present only dull brown, grey, or dull purple colours, little is seen of them. They rest on leaves of shrubs of moderate height, and never fly for any length of time or to a distance, feeling themselves much more secure when at rest. There is therefore only one way to see and capture them, and that is to walk through the underwood and disturb them by beating the bushes and low trees, and thus to cause them to fly. The following species are found only in the mountains at high elevations:—*A. azinis*, de Nicéville, *A. azata*, de Nicéville, *A. teesta*, de Nicéville, *A. anthelus*, Doubleday and Hewitson, *A. ovomaculata*, Hewitson, *A. ammon*, Hewitson, and *A. morphina*, Distant. All the rest occur in the plains. *A. centaurus*, Fabricius, so common elsewhere, we have never seen in Deli, but Dr. Friedl Martin took a single specimen at the Gading Estate in Indragiri, south of Siak, in November, 1894. The rarest species are *A. amphea*, Felder, *A. anniella*, Hewitson, *A. diardi*, Hewitson, and *A. morphina*, Distant. Of the three metallic green species none is common, but *A. farquhari*, Distant, is less scarce than *A. horsfieldi*, Pagenstecher, whereas *A. trogon*, Distant, is the rarest of the three, Dr. Martin in thirteen years' collecting having obtained only two specimens.

429. *CURETIS MALAYICA*, Felder.

Hagen. Originally described from Malacca.

430. *CURETIS ÆSOPUS*, Fabricius.

Originally described from the East Indies.

431. *CURETIS FELDERI*, Distant.

Originally described from Province Wellesley and Sungei Ujong in the Malay Peninsula.

432. *CURETIS SPERTHIS*, Felder.

Hagen. Originally described from Malacca. We have followed Mr. Distant's identifications of these four species, as we have specimens from Sumatra which agree with his descriptions and figures of them. Whether they are all distinct, or how many of them are so, we are not prepared to say. The males are far more commonly met with than the females; which latter have the upperside of the wings orange bordered with black, never with the orange colour replaced by white, the more usual form of the Indian species.

433. *CURETIS INSULARIS*, Horsfield.

A well marked, easily identified, and probably valid species originally described from Java.

434. **CURETIS BULIS*, Doubleday and Hewitson.

Snellen. Typically not met with by us in Sumatra.

435. **CURETIS BARSINE*, Felder.

Hagen. Originally described from Amboina. Not met with by us in Sumatra. All species of *Curetis* in Sumatra occur at low elevations with the exception of *C. malayica*, Felder, which is found in the mountains as well as in the plains. The males usually rest with closed wings on leaves near small streams, never fly for long distances, and do not go down to wet spots on roads very often, though the males are sometimes so found. The females are occasionally only caught in the forest. Their flight is so rapid that they can hardly be followed with the eye, but if they settle on the upperside of a leaf with closed wings their silvery-coloured underside at once betrays them, but if they are frightened they settle on the underside of the leaves, where they are of course invisible.

436. **ZEPHYRUS ABSOLON*, Hewitson.

Z. absolon, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 291, n. 23, pl. P, figs 33, male; 34, female (1895).

Recorded by me from West Java; recently captured by Dr. Hagen

on Mount-Kaba, 5,200 feet, in South Sumatra. He saw seven or eight specimens, but caught only one male, which Dr. Martin has seen.

437. *ILERDA ILA*, de Nicéville, n. sp.

Hagen as *epicles*, Godardt [sic].

HABITAT: Battak mountains, N.-E. Sumatra.

EXPANSE: ♂, 1.4 to 1.5; ♀, 1.5 to 1.6 inches.

DESCRIPTION: MALE. UPPERSIDE, *forewing* differs from typical *I. epicles*, Godart, from Java, in the iridescent deep purple colour being of greater extent, approaching much nearer the costa and the outer margin; never with a diffused yellow patch beyond the end of the discoidal cell. *Hindwing* with the purple coloration of greater extent also, the orange lunules on the margin greatly reduced in size and fewer, confined more to the anal angle. UNDERSIDE, both wings as in *I. epicles*. FEMALE. UPPERSIDE, *forewing* differs from typical *I. epicles* in having the orange area much larger, almost reaching the base of the wing. *Hindwing* differs in having a very large continuous orange area occupying the outer half of the wing, instead of a series of conjoined broad marginal lunules, with sometimes a small indistinct diffused orange patch on the disc. UNDERSIDE, *both wings* as in the male.

It is possible that "*Thecla*" *phœnicoparyphus*, Holland, described from Hainan Island, (the type being said to be a male but probably actually a female) is the name which will have to be applied to the Western Chinese and Indian form of *I. epicles*, as from the figure and description of the type of that species, the orange areas on the upper-side of both wings appear to be of about the same extent; the forewing, however, has the orange area (though it is variable in extent) always less than half as large as it is in true *I. epicles*. *I. ila* differs from both in the female by the orange area on the upper-side of the hindwing occupying fully half the surface instead of being confined to a marginal band.

I. ila is not very common on the Central Plateau, but occurs throughout the year, as there are specimens in Dr. Martin's collection taken in every month. I have described it from a long series of both sexes.

438. *DACALANA VIDURA*, Horsfield.

Grose Smith. Hagen. Distant. Occurs in the plains and on the outer hills. Is common at Selesseh in April. The collectors brought in perhaps five or six males to one female.

439. CAMENA CIPPUS, Fabricius.

I have caught this species at Selesseh in October, but it is very rare in Sumatra, as Dr. Martin possesses only one other specimen taken in July also near Selesseh.

440. CAMENA COTYS, Hewitson.

Originally described from Nepal. It is very rare in Sumatra, I possess two males only. Probably often overlooked owing to its strong superficial likeness to the more common *Dacalana vidura*, Horsfield.

441. CAMENA CRETHEUS, de Nicéville.

C. cretheus, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 294, n. 24, pl. P, fig. 35, *male* (1895); idem, id., l. c., vol. x, p. , n. 24, pl. T, fig. 35, *female* (1896).

Very rare, occurs in the Battak Mountains of Sumatra in March, and in Western Java. Easily recognised by the base of the costa of the forewing on the underside being yellow.

442. APHNÆUS LOHITA, Horsfield.

Grose Smith. A common species, spread over the whole of our area with the exception of the Central Plateau; the males on roads, on the margins of forest, and also on grassy places; females somewhat scarcer. They are very fond of executing the rubbing and revolving movements of the hindwings observed in many of the *Lycænidæ*.

443. *APHNÆUS SYAMA, Horsfield.

Staudinger. As this species occurs in the Malay Peninsula and in Java, it is almost certainly found also in the intervening island of Sumatra, though we have never met with it.

444. *APHNÆUS VULCANUS, Fabricius.

Hagen. Occurs commonly in Java, and is almost certainly to be found in the south-east of Sumatra, which is only separated from Java by a narrow and shallow strait.

445. APHNÆUS HIENDLMAYRII, de Nicéville.

A. hiendlmayrii, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 38, n. 33, pl. v, fig. 5, *female* (1894).

Very rare, only three female specimens have been obtained in March and August at Selesseh. The male still remains to be discovered.

446. *TAJURIA BURBONA*, Hewitson.

Myrina burbona, Hewitson, Ill. Diurn. Lep., *Lycænidæ*, p. Supplement 24, n. 66, pl. Supplement iiii, fig. 95, *female* (1878).

Charana datoe, Martin.

Hewitson. Hagen as *jalindra*. Staudinger as *jalindra*. Grose Smith. Originally described from Sumatra. It is a local race of *T. jalindra*, Horsfield, from Java, *T. indra*, Moore, from India, and *T. tarpina*, Hewitson, from the South Andaman Isles. The male of the Sumatran race has the black border to the forewing on the upperside narrower than in the allied species. Dr. Martin described the male, Hewitson the female. Only a few males obtained in forest near Selesseh in April, May and June ; no female.

447. **TAJURIA LONGINUS*, Fabricius.

Staudinger. Found on both sides of Sumatra—in Java and in the Malay Peninsula—so it is almost certain to occur in Sumatra also.

448. *TAJURIA MANTRA*, Felder.

From Namoe Oekor to Bekantschan; is rarer than the species which next follows.

449. *TAJURIA TRAVANA*, Hewitson.

Grose Smith. Distant. Staudinger. Kirby. Butler. Originally described from Sumatra and Borneo. Common at low elevations in Sumatra.

450. *TAJURIA TURA*, de Nicéville.

T. tura, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 301, n. 27, pl. P, fig. 39, *male* (1895).

Found very rarely in August in the Battak Mountains of Sumatra, and in Western Java.

451. *TAJURIA TYRO*, de Nicéville.

T. tyro, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 302, n. 28, pl. P, fig. 40, *female* (1895).

Occurs rarely in Burma and Sumatra.

452. **TAJURIA ISÆUS*, Hewitson.

Grose Smith. Kirby. Originally described from Sumatra and Sarawak in Borneo. We have seen no specimen of it from Sumatra. See remarks below, No. 458.

453. *TAJURIA THRIA*, de Nicéville.

T. thria, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. , n. 26, pl. T, figs. 38, male; 39, female (1896).

Found in Tenasserim, Burma, and the Battak Mountains south of Bekantschan, Sumatra, in March, May and July. It is rare, and may easily be distinguished from its allies by the male being entirely black on the upperside of the forewing.

454. *TAJURIA BLANKA*, de Nicéville.

T. blanka, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 39, n. 34, pl. iv, fig. 4, female (1894).

Two females of this very rare species have been obtained in the higher mountains; the type specimen in October, 1893.

455. *TAJURIA DONATANA*, de Nicéville.

Originally described from Burma. Two male specimens only have been obtained in March and July at Bekantschan at the foot of the Battak mountains in Sumatra. This species is quite distinct from the Celebesian species, *T. orsolina*, Hewitson, to which it is nearly allied.

456. *OPS OGYGES*, de Nicéville.

O. ogyges, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 298, n. 25, pl. P, figs. 36, male; 37, female (1895).

Originally described from Maulmain in Burma. Very rare, Dr. Martin obtained one male specimen in the Battak mountains in September, 1894, which I have not seen.

457. *OPS MELASTIGMA*, de Nicéville.

In *O. ogyges*, de Nicéville, the "male-mark" on the disc of the forewing on the upperside is indistinct, and can be seen only in certain lights. In *O. melastigma* it is exceedingly prominent, quadrate, and dingy black or fuliginous in colour. It is very rare in Sumatra, Dr. Martin possesses a single male taken in the Battak mountains in December.

458. *BRITOMARTIS CLEOBOIDES*, Elwes.

B. cleoboides, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 306, n. 1 (1895).

Messrs. Grose Smith and Kirby have both recorded *Tajuria isæus*, Hewitson (see No. 452) from Sumatra, but probably the specimens so identified should be the present one, which has only recently been described. The true "*Iolaus*" *isæus*, the type specimen of which was

probably from Sumatra (Hewitson gives Sumatra and Sarawak as the habitat of *I. isæus* on page 44 of Ill. Diurn. Lep.), is a *Tajuria*. It was described from a male, its female being probably the *T. relata* of Distant. Hewitson in Supplement page 10 of the above-quoted work described a male *I. isæus* (which I identify as *Britomartis cleoboides*, Elwes), from Borneo, and said, incorrectly as I believe, that his first description and figure instead of applying to a male should be to a female. To sum up:—"Iolaus" *isæus*, and *Tajuria relata*, Distant, stand as *Tajuria isæus*, Hewitson, male and female, from the Malay Peninsula and Sumatra; while Hewitson's second figure of "Iolaus" *isæus* in the supplement of his book, which is also taken from a male, stands as *Britomartis cleoboides*, Elwes, from Burma, Sumatra, Java and Borneo. It is rare in Sumatra, found in June and July at Selesseh.

459. *BRITOMARTIS BUTO*, de Nicéville.

B. buto, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 308, n. 29, pl. P, fig. 41, female (1895).

Occurs in Burma and Sumatra; described from a single example from each locality.

460. *SUASA SUESSA*, de Nicéville.

S. suessa, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. vii, p. 337, n. 14, pl. H, figs. 8, male; 9, female (1892).

Originally described from the Malay Peninsula. Found very rarely in the Battak mountains from Namoe Oekor to Bekantschan in December and January, and again in July.

461. **THAMALA MARCIANA*, Hewitson.

Butler. Kirby. Grose Smith. Originally described from Sumatra, and Sarawak in Borneo, but not obtained by us. It almost certainly occurs in Sumatra, as it is found in the countries on both sides of it.

462. *HYPOLYCÆNA ERYLUS*, Godart.

Hagen as *erylus*, Godardt [sic]. Common at low elevations and throughout the year. The female is very rare.

463. *HYPOLYCÆNA THECLOIDES*, Felder.

Staudinger. Very rare, only two specimens obtained, both females, one at Selesseh, the other in Indragiri in February.

464. *HYPOLYCÆNA SIPYLUS*, Felder.

I possess a single worn female example from Sumatra which

appears to represent this species. It occurs also in Celebes and Amboina; the allied *H. tharrytas*, Felder, being found in the Philippines.

465. *CHLIARIA TORA*, Kheil.

C. tora, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 311, n. 31, pl. P, fig. 43, *female* (1895).

Originally described from Nias; occurs also in the Malay Peninsula in Perak, in Sumatra at Selesseh and Bekantschan, and in Borneo. It flies in every month in the year in Sumatra; the males are found with different species of *Nacaduba*, &c., on wet spots on roads.

466. *CHLIARIA MERGUIA*, Doherty.

Originally described from Lower Burma. Found in Sumatra from Bekantschan to the higher Battak mountains in the last three months in the year, but is a rare species.

467. *CHLIARIA AMABILIS*, Martin.

C. amabilis, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 309, n. 30, pl. P, fig. 42, *male* (March, 1895); *Zeltus amabilis*, Martin, Einige neue Tagschmetterlinge von Nordost-Sumatra, pt. 2, p. 11, n. 9 (October, 1895).

Found in Java. In Sumatra it flies from Selesseh to Bekantschan in June, July and August. Rare, Dr. Martin has obtained five or six specimens only.

468. *ZELTUS ETOLUS*, Fabricius.

Hagen. Grose Smith. Found all over our area and is everywhere common, the males on wet roads, the females much scarcer and flying in the jungle. Dr. Martin has made the same observation that I did fourteen years ago when I first saw this butterfly alive (Journ. A. S. B., vol. 1, pt. 2, p. 59, n. 105 (1881) that "The male when flying over small puddles of water reminds one very much of a common blue-bodied dragonfly."

469. *NEOCHERITRA AMRITA*, Felder.

Grose Smith. Snellen. Hagen. Occurs in the mountains south of Bekantschan in July. We have never seen a male, and the female is rare.

470. *NEOCHERITRA NAMOA*, de Nicéville.

N. namoa, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 41, n. 36, pl. v, fig. 9, *male* (1894).

Described from a unique male captured in the Battak mountains

478 L. de Nicéville & Dr. L. Martin—*Butterflies of Sumatra*. [No. 3, in May, 1893. Since then a second specimen was obtained in December, 1894, at the same locality by a clever Battak collector named Sinobar.

471. NEOCHERITRA NISIBIS, de Nicéville.

N. nisibis, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 316, n. 33, pl. P, fig. 45, *female* (1895).

Described from two females, one each from the Malay Peninsula and Sumatra.

472. THRIX GAMA, Distant.

This is a very remarkable genus, the male having a somewhat similar tuft of hairs on the upperside of the forewing to that found in the genera *Dacalana* and *Arrhenothrix*. It occurs rarely in Sumatra from Selesseh to Soengei Batoe in May, June and July. The males vary in size from 1.45 to 1.75 inches.

473. MANTO MARTINA, Hewitson.

M. martina, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 314, n. 32, pl. P, fig. 44, *female* (1895).

Originally described from Borneo, but is found also in Burma, the Malay Peninsula and Sumatra. Occurs at low elevations as high only as Namoe Oekor from February to July and again in October.

474. JACOONA ANASUJA, Felder.

Hitherto known only from the Malay Peninsula. The female has still to be discovered. Very rare, only two specimens obtained in thirteen years, both at Selesseh in May.

475. NEOMYRINA HIEMALIS, Godman and Salvin.

Hagen. With the exception of *Arrhopala agnis*, Felder, this is the largest of our *Lycænidæ*. Very rare, as it flies very high and quickly in the forest. Dr. Martin once saw a specimen flying across a small open grassy patch from one piece of forest to another. Its flight was so rapid that its long tails were nearly invisible, and at first sight it gave the impression of being a specimen of the smaller white *Catopsilia* (*C. pyranthe*, Linnæus). It is found over the whole of our area, with the exception perhaps of the Central Plateau. Dr. Martin has specimens from the Gayoe-lands, Selesseh, Deli and Asahan. It is probably less rare in the western part of our area, as at Padang Tjermin in Langkat an amateur collector obtained some ten specimens in one year.

476. TICHERRA ACTE, Moore.

Common from Namoe Oekor to the Central Plateau throughout the year.

477. CHERITRA FREJA, Fabricius.

Hagen as *freya* [sic]. Grose Smith. Still commoner than the foregoing species, and occurs in forest only over the whole of our area.

478. RITRA AUREA, Druce.

R. aurea, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. , n. 30, pl. T, fig. 45, female (1896).

Found in large forest near Selesseh, Namoe Oekor, and from Bandar Kwala in Serdang in March, April, May and June. The female is much rarer, and lacks on the upperside the splendid orange gloss on both wings. The silky "male-mark" of this species closely resembles that organ in *Biduanda cinesioides*, de Nicéville, No. 486 below.

479. HORAGA HALBA, Distant.

Originally described from Penang. It occurs from Selesseh to Bekantschan, and in the months of March, July and October. Very rare, as Dr. Martin has not obtained more than four specimens in thirteen years.

480. CATAPÆCILMA ELEGANS, Druce.

Grose Smith. Hagen. Common throughout the year over the whole of our area with the exception of the higher elevations, and found not only in forests, but also near roads, and settled on small bushes. Dr. Martin has never seen this butterfly on the wing in the morning, it appears very late in the day, at one or two o'clock P. M. The males are very fond of fighting, but return always with great exactitude to the leaf from which they started to do battle with the foe, which is usually another male of the same species.

481. SEMANGA SUPERBA, Druce.

HABITAT: Borneo (*Druce*); Malacca, Malay Peninsula (*Distant*); N.-E. Sumatra.

EXPANSE: ♂, 1.1 inches.

DESCRIPTION: MALE. UPPERSIDE, *both wings* differ from those of the female only in having the purple area considerably larger, more shining and richer in shade. *Forewing* with the apex more acute and the outer margin more convex than in the female. *Hindwing* lacks the

discal orange band of the female; the wing is also narrower and the outer margin straighter. UNDERSIDE, *both wings* as in the female.

Grose Smith. In Sumatra it occurs rarely in the Battak mountains and at Selesseh in July, August and October.

482. *BIDUANDA THESMIA*, Hewitson.

Grose Smith. Staudinger. Distant. Very common in the forests from the plains to the elevation of Bekantschan, and occurs all the year round. Both sexes rest on the buds of some moderately high shrub, with the head mostly downwards. It occurs exactly in the same localities and is quite as common as *Marmessus moorei*, Distant, which it greatly resembles. If one species mimics the other it would be difficult to say which is the model and which the one that copies it.

483. **BIDUANDA ESTELLA*, Hewitson.

Hewitson. Grose Smith. Kirby. Both sexes originally described from Sumatra. As Hewitson does not mention any secondary sexual characters in the male, and the inner margin of the forewing as described and figured is straight instead of bowed outwardly, it is more than probable that it does not come into the genus *Biduanda*, as that genus possesses male secondary sexual characters, but in the absence of specimens I do not know where else to place it.

484. *BIDUANDA SCÆVA*, Hewitson.

Originally described from Singapore. In Sumatra it is found only in the mountains at higher elevations, where it flies throughout the year, as Dr. Martin possesses specimens from every month. It must be very common under favourable conditions, as one collector once brought in a consignment of sixty specimens. The female is very rare.

485. *BIDUANDA NICEVILLEI*, Doherty.

First discovered in Burma. Very rare in the Battak mountains, Dr. Martin possesses three females only taken in January, March and December. Dr. Martin thus describes his specimens, the female being hitherto unknown. "FEMALE. EXPANSE: 1.35 inches. UPPERSIDE, *forewing* brown, in the middle somewhat brighter, more reddish. *Cilia* dark brown. *Hindwing* with two subanal black spots, somewhat confluent, bordered inwardly by a large pure white area which occupies the posterior half of the wing; a fine anteciliary black line. *Cilia* white. *Tails* three, white. UNDERSIDE, *both wings* as in the *male*."

486. *BIDUANDA CINESIOIDES*, de Nicéville.

Originally described from the Malay Peninsula. Is not as rare as

the foregoing species, but is much rarer than the two other *Biduandas*. Found in the Battak mountains in January, April, July and December. The male has a very conspicuous sexual mark on the upperside of the forewing.

487. *MARMESSUS MOOREI*, Distant.

Hagen. Staudinger. Distant. Snellen. One of the commonest lycænids of the forest of the plains and outer hills, and flies throughout the year. Superficially very similar to *Biduanda thesmia*, Hewitson, not only in coloration and form, but also in habits. Mr. Distant has figured on pl. xliv, fig. 11 of Rhop. Malay. a very small female of this species as a variety. Such dwarf forms in both sexes are not at all rare in Sumatra.

488. *MARMESSUS BOISDUVALII*, Moore.

Dr. Martin possesses a single pair which appertains to this species, as they have a large discal orange patch on the upperside of the forewing. They were taken in the Battak mountains in February.

489. **MARMESSUS RAVINDRA*, Horsfield.

Hagen. Grose Smith. As this butterfly is found in Nias and Java, it not improbably occurs in south-eastern Sumatra also.

490. *EOOXYLIDES THARIS*, Hübner.

Grose Smith. Moderately common in the low forests at Selesseh and Namoe Oekor, and occurs throughout the year. It is rarer than *B. thesmia*, Hewitson, and *M. moorei*, Distant.

491. *LOXURA ATYMNUS*, Cramer.

Hagen.

492. *LOXURA CASSIOPEIA*, Distant.

Hagen. Originally described from Perak in the Malay Peninsula. Both the species of *Loxura* occur throughout the year at low elevations not much higher than Namoe Oekor in forest or its margins. They have a short and jerky flight, and are weak on the wing, never flying for long distances.

493. *YASODA PITA*, Horsfield.

Grose Smith. Hagen. Originally described from Java.

494. *YASODA PITANE*, de Nicéville.

Y. pitane, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. viii, p. 50, n. 10, pl. L, fig. 5, *male* (1893).

The female of this species still awaits discovery. Both species of *Yasoda* occur only at high elevations, *Y. pita*, Horsfield, in March, October and December at Soengei Batoe, *Y. pitane* only on the Central Plateau in March and August. Both are really and actually rare butterflies.

495. *ARAOTES LAPITHIS*, Moore.

Found from Selesseh to Bekantschan, and is moderately rare in forests from March to August. On the wing its habits are like those of *M. moorei*, Distant, and, as the white band on the underside of the forewing is not seen when resting with closed wings, is often taken for that common species, and thus escapes being captured.

496. *SITHON NEDYMOND*, Cramer.

Grose Smith as *nedymond* and *chitra*. Hagen as *nedymond* and *chitra*. Staudinger. Kirby. Distant. *S. nedymond* is the male and *S. chitra*, Horsfield, the female of one and the same species. Occurs over the whole of our area, as we possess specimens from Stabat, Selesseh, Namoe Oekor, and from the Battak mountains, taken from March to August, and October to December. In primeval forest on low bushes, mostly resting on the underside of leaves. *S. nedymond* and *S. chitra* are always taken at the same time and in the same localities, though we have never succeeded in getting them paired. The species is far less rare than it was formerly believed to be.

497. *DEUDORIX EPIJARBAS*, Moore.

Moderately rare in forests from Selesseh to Bekantschan, the female much rarer than the male. Males differ greatly in size, from 1.2 to 1.7 inches. Flies from March to August and again in December.

498. *ZINASPA DISTORTA*, de Nicéville.

A rare butterfly here as elsewhere, Dr. Martin has only four specimens, three males and one female, the latter captured in January, the former from June to August. Occurs from Namoe Oekor to Soengei Batoe.

499. *RAPALA DELIOCHUS*, Hewitson.

A very rare species. I caught a single male at Selesseh in October. Dr. Martin possesses a few of both sexes from Selesseh to Bekantschan

taken in May, June, July and October. The males vary greatly in size, the smallest measures .95 of an inch, the largest 1.35 inches. The markings and coloration of the underside remind one of those of *Lampides*, which is considered to be a protected genus, and may perhaps to some extent account for the scarceness of specimens of *R. deliochus* in collections, as they are passed over for the common species of *Lampides* which they may mimick.

500. *RAPALA RHÆCUS*, de Nicéville.

R. rhæcus, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 319, n. 35, pl. P, fig. 47, *male* (1895); idem, id., l.c., vol. x, p. , n. 27, pl. T, fig. 40, *female* (1896).

Taken at Bekantschan and in the Battak mountains, where this fine species is fairly common in May and July, rarer in March, April and October. The female on the upperside is somewhat marked with red on both wings, on the inner margin of the forewing, and near the anal angle of the hindwing, an unusual feature in this genus.

501. *RAPALA SCHISTACEA*, Moore.

A few specimens only from Selesseh taken in May and June.

502. *RAPALA SCINTILLA*, de Nicéville.

Hitherto known from Sikhim only. Its occurrence so far south is very interesting. It is quite a distinct species, which can always be discriminated in both sexes by the peculiar coloration of the underside alone, though as regards the male the restriction of the blue gloss to the upperside of the hindwing best distinguishes that sex. In Sumatra it is commoner than *R. schistacea*, Moore, and is found from Selesseh to Bekantschan from March to June.

503. *RAPALA ORSEIS*, Hewitson.

Hewitson. Grose Smith. Kirby. Distant. Originally described from Sumatra, certainly the commonest species of the genus, and found from Bindjei to Soengei Batoe throughout the year.

504. **RAPALA CHOZEBA*, Hewitson.

Hewitson. Grose Smith as var. *chozeba*. Hagen as *Deudoryx* [sic] *chozeba*. Kirby. Originally described from Sumatra. We have failed to recognise it. It is very near to *R. orseis*, Hewitson.

505. *RAPALA NISSA*, Kollar.

Only two females taken in the Battak mountains in October, 1893.

506. *RAPALA ABNORMIS*, Elwes.

R. abnormis, Elwes, Proc. Zool. Soc. Lond., 1892, p. 642, pl. xlv, fig. 2, *male*.

Originally described from the Karen Hills, Burma. A very rare species with the underside quite uniquely marked. Three specimens from the Battak mountains in July.

507. *RAPALA PHERITIMA*, Hewitson.

Originally described from Borneo (Sarawak). It is recorded by Moore in Proc. Zool. Soc. Lond., 1883, p. 528, from Tounghoo in Burma, Singapore, and Sumatra, but not from Borneo, from whence the type came. Dr. Martin obtained a single pair in Indragiri in Eastern Sumatra in February.

508. *RAPALA RHODOPIS*, de Nicéville.

R. rhodopis, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. , n. 28, pl. T, figs. 41, *male*; 42, *female* (1896).

Occurs rarely in the Battak mountains in March, May, July, August, and September, and again in December. Also one male taken at Selesseh.

509. *RAPALA RHODA*, de Nicéville.

R. rhoda, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. , n. 29, pl. T, figs. 43, *male*; 44, *female* (1896).

Described from a single pair obtained in the Battak mountains in February.

510. *RAPALA SUFFUSA*, Moore.

Originally described from Burma, found also in Assam. Rare in Sumatra, Dr. Martin possesses only two females, and I three males and two females taken at low elevations.

511. **RAPALA MELAMPUS*, Cramer.

Snellen as *Deudoryx* [sic] *melampus*. Hagen as *Deudoryx* [sic] *melampus*. As Heer P. C. T. Snellen has recorded this species in two of his papers on the butterflies of Sumatra as well as Dr. Hagen, there can be no reasonable doubt that it occurs in the island, though we have not met with it.

512. *RAPALA JARBAS*, Fabricius.

Next to *R. orseis*, Hewitson, this is the commonest species of the genus in Sumatra at low elevations, not higher than Namoe Oekor.

Occurs not only in forest, but also in gardens and near houses. It often flies very late in the afternoon, Dr. Martin has taken it between 5 and 6 P.M.

513. *RAPALA XENOPHON*, Fabricius.

Distant. Much rarer than *R. jarbas*, Fabricius, and occurs at a higher elevation from Selesseh to Bekantschan. We have specimens taken in March, July, and December only.

514. *RAPALA DOMITIA*, Hewitson.

Grose Smith. Dr. Martin obtained a single female in November at Kepras. It is a most aberrantly-marked and coloured species.

515. *BINDAHARA PHOCIDES*, Fabricius.

Very rare in Sumatra, Dr. Martin in thirteen years having obtained only three males and one female in February, May, and July. Only from higher elevations in the Battak mountains. Distant's figure of the species (*Rhop. Malay.*, pl. xx, fig. 25, *female*) is an exceptionally bad one. The males vary greatly in size, the smallest measuring 1.35, the largest 1.75 inches; Dr. Martin's only female taken in February measures 1.6 inches.

516. *BINDAHARA SUGRIVA*, Horsfield.

One male only, taken in the Battak mountains in July. It is on the underside of both wings very similar to the same sex of *B. phocides*, Fabricius, but it has on the upperside of the hindwing a blue band extending along the margin from the apex to the third median nervule, and increasing in breadth posteriorly. The occurrence of this species recorded from South India, Ceylon and Java, together with *B. phocides*, Fabricius, (which has no blue band in the male), recorded from Sikhim, Bhutan, Assam, Burma, the Andaman Isles, the Malay Peninsula, and Nias, in North-Eastern Sumatra is a very interesting fact. Mr. W. H. Miskin records *B. sugriva* from Cape York in North Australia, the Solomon Islands, and the Aru Islands, but in my opinion these specimens are probably not typical, but represent distinct local races.

517. **SINTHUSA NASAKA*, Horsfield.

Grose Smith. Originally described from Java, so that it is quite possible it occurs also in Sumatra though we have not met with it, especially as it is found again in Northern India.

518. *SINTHUSA AMBA*, Kirby.

Originally described from Malacca, occurs also in Burma.

519. *SINTHUSA MALIKA*, Horsfield.

S. malika, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 43, n. 37, pl. v, figs. 18, *male*; 6, *female* (1894).

Snellen. Grose Smith. Kirby. This species and *S. amba*, Kirby, occur in the mountains rarely at higher elevations south of Bekantschan. Of *S. amba* Dr. Martin possesses specimens taken in April and May, and again in July and August, and *S. malika* in March and April, June and July, and October and December, so of the former there may be two, and of the latter three generations in the year.

Family PAPILIONIDÆ.

Subfamily PIERINÆ.

520. *LEPTOSIA XIPHIA*, Fabricius.

Snellen as *nina*. Wallace as *nina*. Hagen as *nina*. Distant. Very weak and slow on the wing, and behaves exactly as the European *Leptidia* (= *Leucophasia*) *sinapis*, Linnæus, does, flying near the ground and seldom settling. It has been well named "The Wandering Snowflake." Occurs in open places in forests or on their margins, from Selesseh to Bekantschan, rather rare than common, occurs all the year round except possibly in June, from which month Dr. Martin does not possess any specimens with dates.

521. **DELIAS NINUS*, Wallace.

Hagen as *ninus* and *dione*. Staudinger as *dione*. Originally described from Mount Ophir, Malacca, Malay Peninsula. Dr. Hagen records it from the Karo mountains. We have not met with it. According to von Mitis (Iris, vol. vi, p. 100, n. 5 (1893), *D. aglaia*, Linnæus, is an older name for *D. dione*, Drury, that species however being confined to the Eastern Himalayas, Assam, Burma, and China. Von Mitis restricts *D. ninus* to the Malay Peninsula.

522. **DELIAS PARTHENOPE*, Wallace.

Hagen. Mitis. Originally described from Singapore and Borneo. Not obtained by us. Dr. Hagen says it is found only on the alluvial plain near the sea, is the only butterfly of the mangrove forest, and is even sometimes observed at sea.

523. **DELIAS EGIALEA*, Cramer.

Wallace. Snellen. Staudinger. Kirby. A Javan species, which may perhaps occur at the south-eastern end of Sumatra.

524. *DELIAS TOBAHANA*, Rogenhofer.

D. tobahana, Rogenhofer, Verh. zool.-bot. Gesellsch. Wien, vol. xlii, p. 571, n. 1 (1893); id., Mitis, Iris, vol. vi, p. 102, n. 13, pl. ii, fig. 1, *female* (end of January, 1893).

D. derceto, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. vii, p. 557, n. 12 (23rd April, 1893); idem, id., l. c., vol. viii, p. 52, n. 12, pl. L, fig. 4, *male* (1893).

Rogenhofer. Hagen. Originally described by Herr Rogenhofer and I from Sumatra. Found only on the Central Plateau in the Toba and Karo districts, where it is by no means common, and strange to say, the males rarer than the females. Dr. Martin has specimens taken only in March, May, June, July, and September. It is of very delicate structure, and seldom seen perfect.

525. *DELIAS BELLADONNA*, Fabricius.

Pieris chrysorrhæa, Vollenhoven, Mon. Piérides, p. 6, n. 3, pl. ii, fig. 4, *male* (1865).

Kirby as *chrysorrhæa* [sic]. I do not propose in this place to discuss the innumerable forms of this species which have been described and named, of which von Mitis enumerates seven "varieties" besides the type, and has omitted two others, *D. hearseyi* and *D. boyleæ*, both of Butler. To these names I have to add the "*Pieris*" *chrysorrhæa* of Vollenhoven, described from the mountains in the interior of Sumatra. This species does not appear to have ever been properly understood, even von Mitis in his recent Monograph of the genus does not put it in the same group as *D. belladonna*. The figure differs from our specimens of *D. belladonna* from the Battak mountains in having the white areas on the upperside of both wings, but especially of the hindwing, larger and more or less coalescing. The figure does not show the characteristic yellow spot at the base of the hindwing on the upperside owing to the way the specimen drawn was set, the costa of the hindwing being broadly covered over by the forewing. The non-perception of this spot is probably the cause that the species appears never to have been recognised until now, combined with the fact that *D. belladonna* in none of its forms was ever suspected to occur in the region of the equator. The vast stretch of country between Assam, the most southernly point hitherto known for *D. belladonna*, and Sumatra has however been partially bridged over by the discovery of the butterfly by Capt. E. Y. Watson in the Chin and Shan Hills of

Upper Burma, and by Colonel C. T. Bingham at the top of Mooleit mountain and at a lower elevation in the Daunat Range, both in Middle Tenasserim, Burma. The Burmese and Sumatran specimens in our collection quite agree, and would probably be called var. *amarantha*, Mitis, by the describer, who gives Darjiling as the habitat of that form. In Sumatra it is very rare, occurring only at Soengei Batoe and on the Central Plateau, Dr. Martin in thirteen years collecting only obtained ten specimens, of which seven were captured in June and July, and one each in January, March, and October. All these specimens shew but little variation in colouring and markings. The single female Dr. Martin possesses has the ground-colour slightly lighter than in the male, more brown than black, the spots on both wings are larger and more yellow, in the male they are whitish, and the anal area is pale yellow instead of dark yellow as in the male. Dr. Martin gives the expanse of his male specimens as 1·8 to 2·4, of the female 2·3 inches, hence they average somewhat less than specimens from the Eastern Himalayas. Since the above was in type I have seen Heer P. C. T. Snellen's note on this species in Tijds. voor Ent., vol. xxxviii, p. 26 (1895), in which he calls *P. chrysorrhæa* a small local variety of *P. belladonna*.

526. *DELIAS GLAUCE*, Butler.

Snellen as *belisama*. Hagen as *belisama*, and *belisama*, var. *glauce*. Wallace as *belisama*. Staudinger as *belisama*. Kirby as *belisama*. Grose Smith. The true *D. belisama* of Cramer, is, I believe, confined to Java, while *D. glauce* takes its place in Borneo and Sumatra. It is common on the Central Plateau round the Battak kampongs, where it frequents the red flowers of the "Datap" trees (*Erythrina indica*, Lam.), according to Dr. Hagen. Dr. Martin has obtained a few specimens also from Soengei Batoe and even from Bekantschan, where they may perhaps have been carried by one of the frequent heavy storms that occur in the mountains. The female is very melanic in its colouring, as the white areas on the upperside of both wings in the male are very greatly reduced in the female. It occurs most commonly from May to July, but it flies in every month in the year.

527. *DELIAS HYPARETE*, Linnæus.

Hagen. Wallace. Common over the whole of our area, even on the Central Plateau, mostly in orchards near houses, as the species of *Viscum* on which the larva feeds grows very frequently upon fruit-trees, especially on *Anonaceæ*. It flies throughout the year, but is most abundant in May. The larva is yellow and hairy; the pupa is dark

yellow with deep shining black (as if varnished) spots. The males are very fond of flowers, on which they settle with closed wings like an *Euploea*. It is almost certain that all the species of *Delias* feed in the larval state on *Viscum* and *Loranthus* which are found everywhere, and as there are species of *Loranthaceæ* occurring also on Rhizophores (Mangrove trees) on the sea beach, the strange fact which has been observed by Dr. Hagen that *D. parthenope*, Wallace, is the only butterfly found in the Mangrove forests, is explained.

528. *DELIAS SINGHAPURA*, Wallace.

Hagen. One female only obtained near Selesseh in June, 1894.

529. *DELIAS DANALA*, de Nicéville.

D. danala, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. viii, p. 51, n. 11, pl. L, fig. 9, *male* (1893).

D. karo, Hagen, Iris, vol. vii, p. 33, n. 61, pl. i, fig. 4, *male* (1894).

Hagen as *karo*.

530. *DELIAS HAGENI*, Rogenhofer.

D. hageni, Rogenhofer, Verh. zool.-bot. Gesellsch. Wien, vol. xlii, p. 572, n. 2, (end of January, 1893); id., Mitis, Iris, vol. vi, p. 113, n. 75, pl. iii, fig. 5, *male* (1893).

D. datames, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. vii, p. 557, n. 10 (23rd April, 1893); idem, id., l. c., vol. viii, p. 53, n. 13, pl. L, fig. 8, *male* (1893).

D. simanabum, Hagen, Iris, vol. vii, p. 34, n. 63, pl. i, fig. 3, *female* (1894).

Hagen as *hageni* and *simanabum*. Both *D. hageni* and *D. danala*, de Nicéville, occur only at the elevation of Soengei Batoe and on the Central Plateau; they are most numerous from June to August, during the other months of the year but few specimens have been obtained.

531. *PRIONERIS CLEMANTHE*, Doubleday.

Hagen. Rare in our area, a few specimens only from near Selesseh including one of the excessively rare females. Like *Hebomoia borneënsis*, Wallace, it is more common on our western boundary, as the Gayoe collectors have brought in males in large numbers. Flies from January to June, but is most abundant in February.

532. *PRIONERIS HYPSPYLE*, Weymer.

P. hypsipyle, Weymer, Stet. Ent. Zeit., vol. xlviii, p. 12, n. 10, pl. i, fig. 1, *male* (1887).

Hagen as *hypspyle* [sic]. My female differs from the male only in the forewing being blunter, less produced at the apex. Dr. Martin

and I have obtained a single example each of this sex. The male is somewhat variable, in some specimens more than half the discoidal cell on the underside of the hindwing is black, with a very small basal vermilion patch, while in others there is no black coloration in the cell at all, and the vermilion patch is very large. Intermediate examples occur between these two extremes. Both sexes are quite distinct from the Javan *P. autothisbe*, Hübner. The males are very common, quite as common as are *Hiposcritia pandione*, Hübner, and *H. cardena*, Hewitson, all through the year at Soengei Batoe and on the Central Plateau, where in every month hundreds of males are brought in by the collectors. Both sexes mimic *Delias glauce*, Butler. Dr. Martin thus describes his female example, which was taken in March, 1893:—"Mimics the same sex of *D. glauce*, Butler. The outline of the forewing is quite rounded like that of a *Delias*, and the costa of course is not serrated. The base of the costa of the forewing on the upperside has two minute sulphur-yellow streaks which in the male are black. The upperside of the forewing has a more bluish and the hindwing a more reddish and transparent colour than in the male. The white spots at the apex and on the outer margin of the forewing both above and below are very much reduced, the inner series entirely wanting except the anteriormost spot, the outer series consisting of five spots, in the male there are six, which are indistinct, obsolete, and whitish. The underside of both wings is duller than in the male."

533. CATOPSILIA CROCALE, Cramer.

Hagen as *crocale* (1775), *catilla* (1779), and *pomona* (1775). Wallace as *alcmeone*, Cramer (1777). Grose Smith. Butler. Distant. This is the largest and commonest species of *Catopsilia* occurring in Sumatra. Most authors retain *C. catilla*, Cramer, as a species distinct from *C. crocale*. I have bred both species from found larvæ (not from the egg laid by a known female in confinement, which is practically the only conclusive test of the distinctness of species), and have failed to discover any differences in the larva and pupa of the two supposed distinct species. My opinion is that *C. crocale* is extremely variable, and that the variations noted are not due to seasonal causes. Dr. Martin does not agree with me that we have here to deal with one protean species, but maintains that there are really two quite distinct species. At his request I give below his reasons for this conclusion. I may add that I have carefully examined a very large mass of material in the collection of the Indian Museum, Calcutta, and my own, and find that the distinctive characters on which Dr. Martin relies to separate them are all quite inconstant and entirely break

down, the black antennæ of *C. crocale* being sometimes found with the ocellated underside of *C. catilla*, and *vice versa*. The restriction of the yellow coloration of the upperside of both wings of the male to the basal area, or its equal diffusion over the whole surface, correlated with the presence or absence of the ocelli on the underside, is also quite an unstable feature by which to distinguish the two species. Dr. Martin writes:—

“I am quite unable to follow Mr. de Nicéville in his amalgamation of *C. crocale* and *C. catilla*, and am forced to keep them separate for the following reasons:—

“*C. crocale*, the far commoner species, occurs in Sumatra on roads, near houses and gardens, and is never found in the forest. It sometimes appears in large numbers, in which case the larvæ are very destructive, as in January, 1893, near the Poengei Estate, five kilometers north of Bindjei, they destroyed in a short time a fine plantation of young iron-wood trees, *Cassia florida*, Vahl., valued at least at \$ 3,000, by eating up all the leaves and suffocating the plants. All the grass and every low shrub near this murdered plantation was covered with the pupæ, and after the butterflies had emerged, the whole place looked as if there was a heavy snow-storm in progress, the air being full of large flakes of snow. I took there many hundreds of specimens of both sexes, but amongst them was not a single *C. catilla*. This seems to me to be an abundantly conclusive fact. The antennæ of *C. crocale* are black in both sexes, and the males have the underside of both wings simply yellow and white of a washed-out shade. The tuft of hair on the inner margin of the forewing is whitish. There are two forms of the female of *C. crocale*:—I, the form figured by Distant in *Rhopalocera Malayana*, pl. xxv, fig. 12, without any yellow colour near the base of both wings on the upperside; Sumatran specimens are even somewhat darker than Distant's figure, and show on the upperside of the hindwing four or five submarginal black lunules, this form being the rarer one. II, the commoner form is brighter, not so black as the first form, the basal half of the upperside of both wings is nearly as yellow as in the male, the black markings on the costa, apex, at the end of the discoidal cell, and the outer margin of the forewing on the upperside are sharper defined. *C. crocale* is enormously common, and occurs throughout the year; the males are fond of flowers, and especially of the *Hibiscus rosa-sinensis*, Linnæus, to the deep crimson cups of which they present a beautiful contrast when settled. The larva feeds on the leaves of the above-mentioned *Cassia florida*, and sometimes in company with *Catopsilia pyranthe*, Linnæus, on *Cassia alata*, Linnæus, and is of a yellowish-green or yellowish-brown colour, with a lateral blackish-brown streak. The

pupa, suspended by a white median girth, is green with a yellow lateral streak and a very pointed head."

"*C. catilla* is found only in the forest, the males on forest roads on wet spots together with *Lycænidæ* and *Papilioninæ*, but they form the larger number of such congregations, and often occur in such large crowds that dog-cart horses get frightened on approaching one of these white spots on the road, which all at once flutters up into the air with an audible sound. If driven away from these favourite spots, they fly rapidly in Indian file up and down the forest roads, and fall in again on the same spot when the danger is passed. *C. catilla* appears never to be a destructive insect as is *C. crocale* at times. The antennæ in both sexes are distinctly red. The male has on the underside of both wings at the termination of the discoidal cell some red spots, one in the forewing, two in the hindwing, the latter with silvery centres. The sexual tuft of hair is of a darker shade of yellow than in *C. crocale*, and the whole colouring of the underside is of a dull, silky, or leather-like gloss. There is also on the underside of the forewing a somewhat obscure reddish band, commencing near the apex of the wing, and extending towards the middle of the inner margin, ending on the second median nervule. *C. catilla* also has two forms of female:—I, the form figured by Distant on pl. xxv, fig. 15, which exhibits numerous varieties as regards the extent of the reddish-brown colour on the underside of both wings, there being all gradations from specimens with very little red to quite dark ones. II, the second form is on the upperside of both wings pale sulphur-yellow, and not dark yellow as in the first form, and the costal and marginal black spots on the upperside of both wings are not so distinct; on the underside there is never any reddish-brown colouring. This form is the rarer, I have always obtained one of it to five of the other. I am entirely ignorant of the larva, pupa, and food-plant of *C. catilla*; but as the larval stages of the two other *Catopsilias* occurring in Sumatra, *C. pyranthe*, Linnæus, and *C. scylla*, Linnæus, which I know very well, differ only slightly from those of *C. crocale*, it may be anticipated that the early stages of *C. catilla* also possess the same characteristics. *C. crocale*, *C. pyranthe*, and *C. scylla* I have bred on different species of *Cassia*, so also *C. catilla* will probably be found some day in the larval stage feeding on a *Cassia* growing in the forest."

534. CATOPSILIA PYRANTHE, Linnæus.

Grose Smith. Snellen. Wallace. Hagen as *pyranthe*, *philippina* and *chryseis*. Distant as *chryseis*. The form of this species found in Sumatra has in both sexes on the upperside of the forewing a broad

outer black margin, this form being the *C. chryseis* of Drury. It is quite typical throughout the Malay Peninsula, but when it reaches the latitude of Burma it gradually merges into typical *C. pyranthe*, which latter is found all over India and Ceylon. It is not seasonally dimorphic in Sumatra as it is in India. In our area it is found only at low elevations, not higher than Namoe Oekor, where it is local owing to the presence or absence of *Cassia alata*, Linnæus, the food-plant of its larva. As this tree is very partial to swampy ground, and even grows in swamps with brackish water, *C. pyranthe* occurs very near the sea, and flies all the year round. It has only one form of female, but it is variable, some specimens being much more melanic than others. The larva is quite green, without the lateral brown streak of *C. crocale*, Cramer. The pupa has a blunt rounded head, not a pointed one as in *C. crocale*.

535. *CATOPSILIA SCYLLA*, Linnæus.

Snellen. Grose Smith. Hagen. Kirby. Distant. Wallace. Dr. B. Hagen informed Dr. Martin that this species was not at all rare near Medan, the capital of the Deli district, from 1879 to 1882. Dr. Martin had never seen it in the plains, and had received a few specimens only from the Central Plateau from Battak collectors. In Penang and Singapore on the mainland of Asia it is always very common in gardens. So Dr. Martin would hardly believe Dr. Hagen that *C. scylla* belonged to the fauna of the plains of Sumatra, especially as Dr. Martin never saw or obtained any specimens from 1882 to 1894. Suddenly in August and September of the latter year, after nearly twelve years interval, *C. scylla* appeared everywhere in Deli and Langkat in suitable places such as gardens and fallow-land near houses where *Cassia sophera*, Linnæus, the food-plant of the larva, grows. Since then *C. scylla* belongs to our fauna, although it is the rarest of all our *Catopsilias*, and we would call attention to the interesting fact that a butterfly has disappeared for twelve years from a spot in every way apparently suitable for its existence, and has again reinstated itself by immigration from the south-west (the Battak and Gayoe mountains) or from the east (the Malay Peninsula over the shallow Straits of Malacca). The larva is dark velvety-green, with a yellowish-white lateral streak, and some very minute black spots on each segment anterior to the streak, the whole surface delicately ringed or indented like a leech. The pupa has a pointed head like that of *C. crocale*, Cramer, but is shorter and more convex than the slender pupa of that species.

536. *UDAIANA CYNIS*, Hewitson.

Pieris cynis, Hewitson, Ex. Butt., vol. iii, pl. *Pieris* viii, fig. 54, male (1866).

Udaiana pryeri, Distant, Rhop. Malay., p. 301 (1885).

Udaiana androides, Hagen, Iris, vol. vii, p. 32 (1894).

Hewitson. Wallace. Butler. Kirby. Distant. Hagen as *cynis* and *androides*. Originally described from Sumatra. I have a large series of both sexes of this species in my collection from three distinct localities, the Malay Peninsula, Sumatra and Borneo. In all of these they present exactly similar and parallel variations. The males have the underside of the hindwing (1) entirely pure white, (2) with the base sprinkled with greenish-fuscous scales, (3) with the base heavily marked with a broad black band, beyond which, crossing the disc of the wing but not reaching the costa or abdominal margin, is a fuscous rather broad line or fascia, and every gradation exists between these three forms. The latter form is the *U. pryeri* of Distant, described from North Borneo. The females vary greatly in the extent of the development of the fuscous coloration on the upperside of both wings, in the palest form, which has been named *U. androides* by Hagen, this is hardly more extensive than in the male, while every gradation exists until the darkest form figured by Distant in Rhop. Malay., pl. xxvi, fig. 6, is reached. In the case of *U. cynis*, *U. pryeri*, and *U. androides* I am sure we have to do with one protean species only. In this Dr. Martin entirely agrees with me for the reason that he has caught all three forms at the same time in the forest near Selesseh. *U. cynis* is found exclusively in the forest and throughout the year, but only at low elevations not higher than Namoe Oekor. The males sometimes come to wet spots on roads together with *Catopsilia catilla*, Cramer, and species of *Terias*; the females are captured on the green flowers of a low creeper in the forest. *U. cynis* never occurs in the black-soil-forests of Deli, but as soon as the red-soil-forests of Langkat and Serdang are entered there it appears at once.

537. *TERIAS HARINA*, Horsfield.

Hagen. Wallace. This is the true *Terias* of the forest, where it is found somewhat rarely frequenting flowers together with species of *Zemeros* and females of *Lycænidæ*. It is found throughout our area, with perhaps the exception of the Central Plateau, and flies throughout the year.

538. *TERIAS LIBYTHEA*, Fabricius.

Snellen as *brigitta*. Hagen as *brigitta*, var. *drona*, and *drona*. The "*Papilio*" *brigitta* of Cramer was described from "La Côte de Guinée."

It is treated by Trimen as a purely African butterfly. The original figure does not at all agree with the original figure of *T. drona*, Horsfield = *T. libythea*, Fabricius, as it has no black border to the hindwing on the upperside. Watson in Journ. Bomb. Nat. Hist. Soc., vol. viii, p. 515 (1894) says that *T. drona* as identified in the British Museum has the "marginal band of hindwing evenly narrow throughout." This is incorrect, as a glance at the original figure will show, at the costa it is broad, fining away to nothing at the anal angle. Butler states in Ann. and Mag. of Nat. Hist., fifth series, vol. xvii, p. 221 (1886) that the unique specimen described by Horsfield is a female. I doubt this, I should say it was a male, as it is clear yellow on the upperside; were it a female it would have a heavy sprinkling throughout of black dots. It therefore agrees in this character with *T. libythea*, which is defined by Watson as having the "marginal band of hindwing broad at apex and narrow at anal angle." Butler in Cat. Fab. Lep. B. M., p. 227, says that *T. libythea* is "an unspotted variety of Horsfield's *T. drona*." From a careful examination of my series of *Terias* of this group, it appears to me that *T. libythea* (following the identification of this species in the British Museum) is the dry-season form, with *T. rubella*, Wallace, as a synonym, and *T. drona* the wet-season form, with *T. senna*, Felder, as a synonym, of one and the same species. The wet-season form (*T. drona*) alone occurs in Sumatra. In Sumatra it is found only on the Central Plateau of Tobah and Karo, and even there is not very numerous and occurs only at certain times. Though the collectors were instructed always to catch this species when they could, they only brought in specimens in December and January, when it appears to be common, and in May and July, when it appears to be rare, and not a single one in any other month, so the species in Sumatra would appear to be double-brooded.

539. *TERIAS TILAHA*, Horsfield.

Hagen. Sumatran specimens have a reniform mark at the end, and a W-shaped mark at the middle of the discoidal cell of the forewing on the underside. The female is paler on both surfaces than the male, of a lighter more gamboge-yellow colour, with the marginal band on the upperside of the hindwing twice as broad, narrow at the apex, very broad at the anal angle, and extending on to the disc on either side of the submedian nervure. It is the rarest *Terias* of our area, found throughout the year on the outer mountains and also in the plains, as several specimens have been obtained at Selesseh, though Dr. Hagen says that it is not found below an elevation of 500 feet. In 1887 Dr. Martin took a specimen at the Terdjoen Estate very near the sea. It

must be more common in the Gayoe-lands, as the Gayoe collectors always brought it in largely.

540. *TERIAS SARI*, Horsfield.

Wallace. Distant. This species is well figured by Distant, and by Snellen in *Midden-Sumatra*, *Lepidoptera*, pl. i, figs. 8, 9, *male* (1892), as *T. hecabe*, Linnæus, var. two. The Sumatran is absolutely identical with the Indian form. Both sexes have a double line at the end and a small linear marking at the middle of the discoidal cell of the forewing on the underside. The female is of a paler yellow colour than the male, with the marginal band on the upperside of the hindwing twice as broad throughout its length, posteriorly inwardly diffused and powdery. *T. sodalis*, Moore, described from the Mergui Archipelago in Lower Burma, the types of which are in the Indian Museum, Calcutta, is a synonym of *T. sari*. Moore says his species is smaller than *T. sari*, but we have Sumatran specimens quite as small, but the marginal band on the upperside of the hindwing in both sexes is certainly somewhat narrower in both sexes of *T. sodalis* than in *T. sari*, but this very poor character is not in my opinion sufficient to separate the two specifically.

541. *TERIAS TOBA*, de Nicéville, n. sp.

HABITAT: N.-E. Sumatra.

EXPANSE: ♂, 1.2 and 1.6; ♀, 1.6 inches.

DESCRIPTION: This species has been well figured by Snellen in *Midden-Sumatra*, *Lepidoptera*, pl. i, figs. 10, 11, *female* (1892), as *T. hecabe*, Linnæus, var. one. It appears to be allied to *T. sari*, Horsfield, and has in both sexes a double line at the end, and two (instead of one) small markings towards the base of the discoidal cell. Like *T. sari*, it has the cilia of both wings black. It differs, markedly, however, from that species in its much smaller size; its very pale primrose colour (*T. sari* is dark yellow); in the very large apical brown patch on the underside of the forewing of *T. sari* reduced to a small linear brown band, and the oblique brown marking at the outer angle of *T. sari* altogether absent. The "male-mark" in this form is short, broad, and very prominent. The female is even paler yellow than the male, being almost as white as in the same sex of *T. harina*, Horsfield. The marginal band on the upperside of the hindwing is twice as broad as it is in the male, being of the same width as in the male of *T. tilaha*, Horsfield. It is possible that the male of *T. toba* has been figured by Distant in *Rhop. Malay.*, pl. xxvi, fig. 13, *male*, as *T. senna*, Felder. True *T. senna* (see No. 538 above) belongs

to quite a different group, *T. toba* being of the *hecabe* group. Described from two males and one female.

542. *TERIAS ANDERSONII*, Moore.

This also appears to be allied to *T. sari*, Horsfield, the males are the same size, the "male-mark" is the same, not as in the preceding species, it agrees with *T. sari* also in the markings of the discoidal cell of the forewing on the underside; differing, however, in its paler colour, though it is not as pale as the preceding species; in having on the underside of the forewing either no apical brown patch or a very small linear one, and no oblique brown marking at the outer angle as *T. sari* has. The cilia is black as in *T. sari*. It differs only from the types of *T. andersonii* now before me in its usually rather larger size and somewhat paler coloration on both surfaces. One specimen agrees in all respects with Distant's figure of *T. senna*, Felder, Rhop. Malay., pl. xxv, fig. 14, *female*, in having the markings of the underside entirely obliterated.

543. *TERIAS HECABE*, Linnæus.

Hagen. Snellen. Grose Smith. Wallace. Distant. This species has been well figured by Snellen in Midden-Sumatra, Lepidoptera, pl. i, figs. 6, 7 *male* [*nec female*] type (1892), see his Index to the Plates, p. 85. According to Capt. E. Y. Watson (Journ. Bomb. Nat. Hist. Soc., vol. viii, p. 509 (1894), *T. hecabe* may be known by never having "More than two streaks or spots in the discoidal cell on the underside of the forewing in addition to the reniform spot on the disco-cellular nervules." He has identified for me from Sumatra both the rainy-season form (true *T. hecabe* and *T. hecabeoides*, Ménétriès), which has "No apical brown patch on the underside of the forewing," and the dry-season form (*T. excavata*, Moore), which has at the "Apex of the forewing on the underside a more or less strongly pronounced brown patch." Seasonal forms in Sumatra, are, I believe, quite unknown, so perhaps, as in the case of *Melanitis ismene*, Cramer, the two forms, dry and wet, which are seasonal in India, occur together and without any reference to the dryness or humidity of the atmosphere in Sumatra. *T. hecabe* is numerically by far the commonest species of the genus in Sumatra, and Capt. Watson has kindly identified six different varieties of it for me, some of which he names *T. hecabeoides*, Ménétriès, *T. excavata*, Moore, *T. swinhoei*, Butler, *T. patruelis*, Moore, and *T. merguiana*, Moore. It would, I think, serve no useful purpose in our at present very superficial and inadequate knowledge of the genus as represented in the Malay Archipelago to define precisely all these varietal forms, some of which may perhaps be distinct species. It remains for a local observer to breed

them carefully in large numbers from eggs laid in captivity, so as to ascertain if these varieties are seasonal forms, true species, or individual variations only. Dr. Wallace notes that "The varieties of this species are infinite over its extensive range, and cannot be profitably separated."

544. *TERIAS SILHETANA*, Wallace.

This species has been figured by Snellen in *Midden-Sumatra*, *Lepidoptera*, pl. ii, figs. 12, 13, *male* (1892) as *T. hecabe*, Linnæus, var. three. It seems to be rare in Sumatra, we possess but very few specimens. It may be known by having three dark streaks or spots (*T. hecabe*, Linnæus, has never more than two) in the discoidal cell of the forewing on the underside in addition to the reniform spot on the disco-cellular nervules. All our specimens are of the rainy-season form, which has the apex of the forewing on the underside unmarked with brown.

545. *TERIAS TECMESSA*, de Nicéville, n. sp.

Terias sari, Horsfield, var. *a*, Distant, *Rhop. Malay.*, p. 305, n. 3, pl. xxvi, fig. 3, *male* (1885).

HABITAT: Penang, Malay Peninsula; N.-E. Sumatra.

EXPANSE: ♂, 2.1 inches.

DESCRIPTION: MALE. Of large size and rich dark yellow coloration on both surfaces. UPPERSIDE, forewing exactly as in Sumatran specimens of *T. sari*, Horsfield. *Hindwing* with the black margin broad, but a little variable in breadth, its inner edge festooned between the veins, dying away to nothing at the anal angle, the black border of about the same width as in *T. sari*. UNDERSIDE, *forewing* with a W-shaped brown marking near the base of the discoidal cell, a prominent zigzagged one across its middle, and a prominent double linear one at its outer end; a large brown apical patch as in *T. sari*, but always bearing outwardly some suffused spots of the yellow ground-colour. *Hindwing* marked as in *T. sari*, but the brown markings rather more prominent. *Cilia* of both wings black throughout.

The large apical brown patch on the underside of the forewing will at once separate it from all the named forms of *T. hecabe*, Linnæus, known to me, but the patch is precisely similar to that found in India in one of the dry-season forms of *T. silhetana*, Wallace, that species, however, having four instead of three disco-cellular markings; while the presence of two markings in the discoidal cell besides the disco-cellular one will distinguish it from *T. sari*.

Described from six males from N.-E. Sumatra and one from Penang. The female is unknown.

546. *TERIAS EUMIDE, Felder.

Grose Smith. Originally described from Celebes. Wallace gives North Celebes and the Sula Islands as its habitat, with a "var." from Batchian. We have seen nothing like it from Sumatra.

547. *TERIAS LATILIMBATA, Butler.

T. latilimbata, Butler, Ann. and Mag. of Nat. Hist., fifth series, vol. xvii, p. 221, pl. v, fig. 5 (1886).

Both sexes originally described from Sumatra.

548. *TERIAS BIDENS, Butler.

T. bidens, Butler, Ann. and Mag. of Nat. Hist., fifth series, vol. xvii, p. 222, pl. v, fig. 7, female (1886).

Originally described from Sumatra from a female.

549. *TERIAS SEMIFUSCA, Butler.

T. semifusca, Butler, Ann. and Mag. of Nat. Hist., fifth series, vol. xvii, p. 222, pl. v, fig. 8, female (1886).

Originally described from Sumatra from a female. We are unable to recognise any of these species of Mr. Butler's.

All *Terias* are weak on the wing, fly slowly, and never leave the ground for a high flight. They are all, with the exception of *T. harina*, Horsfield, found in open places, in gardens, on roads, and near houses, the males frequently assembling in large numbers on wet spots on roads and by the sides of rivers and streams. *T. hecabe*, Linnæus, sometimes appears in swarms, and its larva may then prove very destructive to *Cassia* plantations. *Cassia florida*, Linnæus, is its favourite food-plant, on which the eggs are sometimes deposited singly as are the eggs of the *Catopsilias*, but sometimes on a single leaf a large number are placed in a rhomboid shape. In the latter case the green pilose larva with a yellowish-white lateral streak and a black head (all the larvæ of *Catopsilias* have a head concolorous with the body) live in societies, and the pupa are also suspended sociably, a fact not previously we believe observed in *Lepidoptera*. If the pupa hang from leaves they are green, if near the flowers of the *Cassia* they are yellow, and if the caterpillars leave the food-plant and pupate on certain high *Gramineæ* they are blackish-brown like the seed of the grass. As the pupæ are arranged at regular distances apart, the deception is a very good one and must greatly protect them, as men, animals and birds at a superficial glance would take these pupæ to be only withered flowers of the *Cassia* or ripe seeds of the grass. After six days in the

pupa state the imago emerges. Though so weak and slow in flight, they are very clever in avoiding being caught by the net.

550. *DERCAS GOBRIAS*, Hewitson.

Grose Smith. Wallace. Staudinger. Kirby. Distant. Hagen. Is rather rare, and occurs from Bekantschan to the Central Plateau. Collectors never bring in more than two or three specimens at one time. We have specimens caught from February to August only.

551. *IXIAS LUDEKINGII*, Vollenhoven.

Hagen. Wallace. Kirby. Originally described from a male from the mountainous country in the interior of Sumatra. It is very rare, Dr. Martin has only two males taken in January of the last year of his residence in Sumatra, one caught in the Battak mountains at a high elevation, the other taken near Bohorok near the western boundary of our area, where also Dr. Dohrn's collector obtained several males.

552. *IXIAS FLAVIPENNIS*, Grose Smith.

I. flavipennis, Grose Smith, Nat. Wand. in the East. Arch., p. 275 (1885); id., Grose Smith and Kirby, Rhop. Ex., p. 2, n. 3, pl. *Ixias* i, figs. 6, 7, male [*nec* female] (1888); id., Weymer, Stet. Ent. Zeit., vol. liii, p. 121 (1892).

Thestias flavipennis, Snellen, Tijds. voor. Ent., vol. xxxiv, p. 335, pl. xvi, figs. 1, 2, male; 3, 4, female (1892).

Ixias pyritus, Weymer, Stet. Ent. Zeit., vol. xlviii, p. 13, n. 11, pl. i, fig. 4, male (1887).

Hagen. Snellen. Originally described from Sumatra where it alone occurs and only at high elevations, from Soengei Batoe to the Central Plateau, and the males are very common on the sandy banks of little streams; the females, very rare and taken in the forest only, come to hand in the proportion of one to a hundred males. They probably escape capture by the collectors owing to their white colour, being mistaken for the common species of *Catophaga* and *Hiposcritia*. Occurs throughout the year, Dr. Martin has specimens taken in every month. Both Drs. Martin and Hagen have obtained it from the Gayoe- and Alas-lands, where the butterfly possibly occurs at a lower elevation than in the Battak mountains.

553. *CATOPHAGA NERO*, Fabricius.

Grose Smith. Snellen. Hagen. Wallace. Staudinger. Semper. A very variable species in both sexes. Males from Sumatra have the ground-colour on the upperside of both wings "golden-yellow" (*Appias*

figulina, Butler), rich orange, or deep crimson, with an equally inconstant development of the black markings along the veins, and of the discal fascia. The females also shew somewhat similar variations. Males are not rare in large forest, and frequent wet spots on roads. Females are very rare, Dr. Martin has only four specimens. It is found throughout the year and over the whole of our area except at the higher elevations; even occurs near the sea, Dr. Martin having taken it at the Saentis Estate. It flies very rapidly if pursued. The *A. nebo*, Grose Smith and Kirby, Rhop. Ex., pl. *Appias* i, figs. 1, 2, *male* (1894) described from Upper Burma, and of which I possess both sexes from the same locality taken in April, is I believe only a spring dry-season form of *C. nero*. Other synonyms of this species appear to be *Tachyris galba*, Wallace, described from N. India; *Pieris domitia*, Felder, described from Luzon; *Pieris zamboanga*, Felder, described from Mindanao; *Pieris asterope*, Felder, described from Luzon; *Appias mindanensis*, Butler, from Mindanao; and perhaps the *Tachyris nero*, var. *palawanica*, Staudinger, described from Palawan, is hardly separable.

554. CATOPHAGA HIPPO, Cramer.

Grose Smith as *enarete* and *lyncida*. Hagen as *lyncida* and *hippo*. Wallace. Staudinger as *lyncida*, var. *hippo*. Distant as *enarete*, var. *C. lyncida* was described and figured by Cramer from a male specimen, the habitat given being "Surinam," which, as in nearly all similar cases, was probably a *lapsus calami* for Sumatra. *C. hippo*, Cramer, was figured and described from a female specimen, the habitat given is "The west coast of Sumatra." These two names may perhaps represent opposite sexes of one and the same species; but as Wallace says that "*Tachyris*" *hippo* "Is distinguished from its allies [*Papilio*" *lyncida*, &c.] by the clear ochre-yellow colour of the under surface of the lower wings in both sexes," I have used *C. hippo* for the species, though *C. lyncida* is the older. The latter name applies to the Javan form, which has the ground-colour of the underside of the hindwing entirely white. The *C. enarete* of Boisduval was described from the "Moluccas," probably in error, and is recorded by Dr. Wallace from Borneo, and may perhaps be kept distinct from *C. hippo*, as it has the outer black margin to the hindwing on the underside in the male broader than in that species. *C. hippo* in Sumatra is a constant species, and does not exhibit the great seasonal dimorphism which is found in the Indian forms. It is much commoner than *C. nero*, Fabricius, and the females are not very rare. It is found throughout the year, but only in or near the forest. The males often assemble twenty or thirty together on a small puddle on the road, the female is found in

the forest hunting for flowers for herself, or for the food-plant of her larva. Dr. Martin has often seen them on the same flower that is frequented by the female of *Udaiana cynis*, Hewitson. He has bred the butterfly from the larva found feeding on a small shrub called by the Battaks "Daoen Tangla," which grows on the banks of rivers. The larva superficially does not greatly differ from the larvæ of the *Catopsilias*, but in shape is more slender. The pupa, however, is quite different, with a stellar indented thorax. The imago emerges in seven days. Only bred females have the beautiful olive-green colouring; almost as soon as they fly, this colour is bleached out. *C. hippo* occurs all over our area, and is one of our most common butterflies.

555. CATOPHAGA LEIS, Hübner.

Hagen as *amasene* and *leis*. Distant. Wallace as *alope*. Grose Smith as *alope*. I follow Mr. Distant in his identification of this species, not having Hübner's *Zutraege* Ex. Schmett. to consult; also in considering *C. alope*, Wallace, from India, Sumatra, Java, and Borneo, to be a synonym. *C. amasene*, Cramer, described from China, is superficially like the male of *C. leis*, and probably Dr. Hagen identified this species under that name. Semper identifies *C. leis* as "*Appias*" *agave*, Felder, from the Philippines. In Sumatra *C. leis* is restricted to the plains, and is only found in forest throughout the year. The female is very rare; the male comes to damp spots on forest roads as does *Catopsilia crocale*, Cramer, and many other *Pierinæ*. Common near Paya Bakong, the small forest reserve mentioned in the Introduction (page 359). Distant has well figured the male and two forms of the female from the Malay Peninsula.

556. CATOPHAGA PAULINA, Cramer.

Grose Smith as *albina* and *paulina*. Hagen as *paulina* and *albina*. Semper identifies this species from the Philippines as "*Appias*" *albina*, Boisduval. The male of *C. paulina* from Sumatra exhibits the same variations as it does in India, some specimens on the upperside of the forewing having a marginal black thread only, others have the apex widely, the outer margin decreasingly to the outer angle, powdered with black scales, while there is found every gradation between these two extremes. There are three distinct forms of female, the first and second are white on the upperside of both wings, the third is dark primrose-yellow-coloured; on the underside of both wings the first is of "A glossy tint of pearly-white" as Wallace well expresses it, the second has the apex of the forewing and the entire hindwing rich ochreous, the third has these areas of a different shade, ochreous

diluted with pearly-white, the discal area of the forewing primrose-yellow, with a broad dark gamboge-yellow area occupying the basal two-thirds of the discoidal cell. Dr. Martin thinks that *C. leis*, Hübner, and *C. paulina* may be one and the same species. I keep them distinct as I can from my Sumatran specimens separate them easily into two species in both sexes. The male of *C. leis* has on the upperside of the forewing an inner apical broad black band (*vide* Distant's figure) which is quite wanting in *C. paulina*; the female of *C. leis* has the base of the forewing on the upperside more broadly black especially at the inner margin than in *C. paulina*, the base of the hindwing also black, in *C. paulina* it is white, on the underside of the hindwing in *C. leis* there is a submarginal series of suffused dark spots and the margin itself is also blackish, while in *C. paulina* the hindwing is concolorous throughout. In spite however of these apparently good differences it is quite possible that specimens intergrading between the two species may exist in Sumatra as they certainly do in India. It is an insect of the alluvial plain and occurs in the forests, the males on roads with *C. leis*, Hübner, the females rarer and within the forest. It flies throughout the year, and is common at Paya Bakong and near Selesseh, not found higher than Bekantschan.

557. HIPOSCRITIA PANDIONE, Hübner.

Hagen. Staudinger. Grose Smith as *lelage* [sic]. The *H. lalage* of Doubleday, from the Himalayas, Assam, and Burma, is quite distinct from the present species. Males of *H. pandione* are very common at high elevations from Soengei Batoe to the Central Plateau. The Battak collectors often brought in hundreds of males, but never a female. Occurs throughout the year, as we have specimens caught in every month. Of late the Battaks received orders not to catch any more specimens.

558. HIPOSCRITIA LEPTIS, Felder.

Staudinger. Distant as *leptis*, var. *plana*. Hagen as *leptis*, var. *plana*. The *Appias plana* of Butler was described from Malacca and Borneo, and cannot be retained as distinct from the present somewhat variable species. *H. leptis* is rather rarer than *H. pandione*, Hübner, and occurs throughout the year occasionally near Selesseh but commonly at Bekantschan. The female is very rare, Dr. Martin possesses three only, which present quite distinct indications of an obscure submarginal fascia on the underside of the hindwing, which, however, is absent in three females from Sumatra and one from Java in my collection.

559. HIPOSCRTIA CARDENA, Hewitson.

Grose Smith. Snellen. Wallace. Distant. Hagen. Quite as common as *H. pandione*, Hübner, and occurs in the same localities throughout the year. No female obtained.

560. SALETARA NATHALIA, Felder.

Grose Smith. Snellen as *panda*. Hagen. Wallace. Distant as *nathalia* and *panda*. Mr. Distant records both *S. panda*, Godart, and *S. nathalia* from the Malay Peninsula and Sumatra. Dr. Wallace considers that *S. panda* is confined to Java, while *S. nathalia* also occurs in Java, and in the Malay Peninsula, Sumatra, Borneo, the Philippine Isles, and Celebes. *S. panda* in the male is known by the pale primrose-yellow colour of the upperside, while *S. nathalia* is "creamy white with a faint greenish tinge." I greatly doubt if this character is sufficiently constant to separate the two species, I have one specimen from Sumatra which is quite intermediate between them. Mr. Distant considers that *S. nathalia* having five [three according to my way of computing them] subcostal nervules to the forewing in the male, while *S. panda* has only four [two], while the females of both species has four [two], is a character by which the two species may be separated, though he admits that he has a specimen of *S. nathalia* in which one wing has the neuration of *S. nathalia*, while the other has that of *S. panda*. In my series of thirty males of this genus, I have one from the Philippines and one from Singapore with two subcostal nervules only, one from Singapore, one from Great Nicobar, and one from Little Nicobar with two subcostal nervules on one side only and three on the other, while all the rest have three subcostal nervules on both sides. The females seem to be more constant, having two subcostal nervules only in all the specimens I have been able to examine. Neuration certainly will not suffice to keep these two species distinct. I use Felder's name for the species as most of the writers on Sumatran butterflies have done so, and as the majority of male specimens from thence agree with the description of that species rather than with that of *S. panda*, the older name. It has been beautifully figured by Heer P. C. T. Snellen as *Pieris panda*, Godart, in Midden-Sumatra, Lepidoptera, pl. ii, figs. 9, 10, male; 6, 7, female (1892). It is found only in the forest at low elevations, not higher than Namoe Oekor as far as we have noticed, but Dr. Hagen mentions its occurrence on the Central Plateau. Not at all common, and flies from March to July. The *Saletara schoenbergi* of Semper, described from Nias and South-East Borneo, also from Great and Little Nicobar in my collection, has been described and figured by

Snellen in Tijds. voor Ent., vol. xxxviii, p. 24, pl. i, fig. 3, *male* (1895), as *Pieris panda*, Godart, var.

561. *HEBOMOIA BORNEENSIS*, Wallace.

Grose Smith as *glaucippe*. Snellen as *glaucippe*. Hagen as *glaucippe*, var. *sumatrana*, Hagen; and *glaucippe*, var. *sumatrensis*, Hagen. Wallace as *glaucippe*. Distant as *glaucippe*. As will be seen above, all authors have recorded this species as *H. glaucippe*, Linnæus, except Dr. Hagen, who in his first Sumatran paper calls it *H. glaucippe*, var. *sumatrana*, and in his second paper *H. glaucippe*, var. *sumatrensis*, for the reason that other local races have been named *H. celebensis*, Wallace, *H. borneënsis*, Wallace, *H. philippensis*, Wallace, and *H. javanensis*, Wallace [nec *javaensis*, Hagen]. But Dr. Hagen's names cannot stand, as the Sumatran race is identical with the Bornean one which has already been named, and has the orange apical area on the upperside of the forewing in the male reduced to a patch half as large as that found in true *H. glaucippe* from North India, Burma, and the Malay Peninsula. The South Indian and Ceylonese form strangely enough agrees with the Javan, and should therefore be known as *H. javanensis*, Wallace. *H. borneënsis* is rare in our area. Dr. Martin has only once at Namoe Oekor captured a specimen himself, and Dr. Hagen records only two specimens from Sumatra. These three specimens were observed by their captors to settle quite suddenly on a low shrub with folded wings, having descended from a high and rapid flight. From Selesseh, Bohorok, and the outer ranges of the Battak mountains a few specimens have been obtained, including two females only; but on the western boundary of our area it must be very common, as the Gayoe collectors brought in hundreds of males. It flies from March to August, but is most abundant in May.

562. *NEPHERONIA VALERIA*, Cramer.

Wallace. Staudinger. Hagen. Semper as *lutescens*. *N. valeria* was originally described from a male from Java. *N. lutescens*, Butler, was originally described from a male from Borneo. Wallace, while retaining the Bornean form under *N. valeria*, says that the male has the forewing rather more elongated than in the typical Javan form, with a slightly concave outer margin. I have a large series of both sexes of *N. valeria* from the Malay Peninsula (called *N. lutescens* by Distant), Sumatra, Nias, Java, and Borneo. I find both sexes in all localities slightly variable, and I do not think it is possible to create (in the sense of separating them off into local races with distinctive names) local races for them. *N. valeria* is a very quick flying and restless insect,

is not very rare at Selesseh and in the outer hills as far as Bekantschan, and is found from March to September, but not in any other month. The female is decidedly rare, and always has the basal markings on the upperside of both wings gamboge-yellow. It is a beautiful mimic of *Danais aspasia*, Fabricius.

563. *HUPHINA NADINA*, Lucas.

Snellen. Hagen as *remba*. The *Huphina remba* of Moore is a quite distinct species, and is confined to South India and Ceylon. *H. nadina* is very common at high elevations, at Soengei Batoe and on the Central Plateau, on the sandy banks of hill streams throughout the year. The female is very rare, and Dr. Martin has only obtained two specimens in thirteen years.

564. *HUPHINA NERISSA*, Fabricius.

Hagen as *Pieris nerissa*, Fabricius, var. *sumatrana*, Hagen. *H. nerissa* appears to be the oldest name for the species of this group, and was originally described from China, Butler records it from Hong-Kong, the Indian forms of which, generally known as *H. phryne*, Fabricius, appear to be highly variable and subject to seasonal dimorphism in all localities where the climate exhibits two well-marked seasons, a wet and a dry. Even specimens from a limited area and an equable climate like the Battak mountains in Sumatra shew considerable variation in the coloration of the underside of both wings, some examples being much richer yellow than others, and the black lining to all the veins greatly differing in width. It is much rarer than the foregoing species, but is found in the same localities from April to September, most numerous in May and July. Dr. Martin possesses no female.

565. *HUPHINA LEA*, Doubleday.

Grose Smith as var. *naomi*. Snellen. Hagen as *lea* and *amalia*. Wallace as *amalia*. Kirby as *amalia*. Distant as *amalia*. The "*Pieris*" *naomi*, Wallace, was described from Lombock and Flores, and is not at all likely to occur in Sumatra. "*Pieris*" *amalia*, Vollenhoven, was originally described from Sumatra and Banca, a female from the latter island being figured. Vollenhoven gives for "*Pieris*" *lea* the islands of Borneo and Banca, so that both species according to him occur in the latter island. Wallace keeps the two species distinct, and gives Borneo and Banca for *H. lea*, Singapore and Sumatra for *H. amalia*. I have a large suite of specimens of *H. lea* from Burma, the Malay Peninsula, Sumatra and Borneo, and am unable to find any constant character by which *H. amalia* can be distinguished from it.

Males of *H. lea* are common in the forests of both the plains and mountains, and we have specimens taken at Selesseh and Bekantschan from February to October, but none from the remaining months. The female is decidedly rare.

566. **HUPHINA JUDITH*, Fabricius.

Hagen. *H. judith* is confined, as far as I am aware, to Java, where it replaces *H. lea*, Doubleday, of Borneo, Banca, Sumatra, the Malay Peninsula, and Burma. The occurrence of *H. judith* in Sumatra, is, I think, more than doubtful.

Subfamily PAPILIONINÆ.

567. *TROIDES (Trogonoptera) BROOKIANA*, Wallace.

Grose Smith as *brookeana* [sic]. Snellen as *brookeana* [sic]. Hagen as *brookeana* [sic]. Wallace as *brookeana* [sic]. Rothschild as *brookianus* [sic]. Distant as *brookeana* [sic]. Staudinger. Kirby. Occurs throughout the year in the plains and outer hills, not much higher than Bekantschan, at Selesseh, and even near Bindjei, in Padang Bedagei and Asahan down the coast; abundant at Quala Loemoerak near Bohorok, where the males are fond of frequenting a hot sulphur spring. The female is very rare, Dr. Martin obtained only three.

568. *TROIDES (Pompeoptera) HONRATHIANA*, Martin.

Ornithoptera honrathiana, Martin, Berl. Ent. Zeitsch., vol. xxxvii, p. 492 (1892); idem, id., Nat. Tijd. voor Neder.-Indië, vol. liii, p. 332, n. 1 (1893).

Martin. Hagen. Rothschild as *T. vandepolli honrathianus*. This is a local race of "*Papilio*" *van de polli*, Snellen, Tijd. voor Ent., vol. xxxiii, p. 22 (1890), from Java, differing therefrom in the abdomen in both sexes being very hairy and entirely black instead of more or less yellow beneath. It is found only on the Central Plateau, and never below 3-4,000 feet, and is not so rare as *T. cunifer*, Oberthür. The egg is salmon-coloured. The types were taken in December, but it probably flies all the year round.

569. *TROIDES (Pompeoptera) HELENA*, Linnæus.

Cramer as *minos*. Snellen. Grose Smith as *minos*. Kirby as *minos*. Hagen as *hephæstus*. Wallace as *pompeus*. *T. pompeus*, Cramer, by which name this species is generally known, was originally described from a female from Batavia in Java. *T. minos*, Cramer, was originally described from a female said to have come from the West Coast of Sumatra, but is really confined to S. India. *T. helena* is common throughout the

year in the plains of Sumatra, but does not occur probably much higher than Namoe Oekor. It flies quite close to the sea, as Dr. Hagen took it plentifully in his garden near Laboean. There are two forms of female; I, with somewhat light, whitish forewing and very black hindwing, which is the rarer; II, with entirely black forewing, but with only small black spots on the hindwing, which is the commoner. Every gradation between these two extreme forms exists in Sumatra as elsewhere. Rothschild records the typical form from S.-E. Sumatra; also (*b*²), *ab. pluto*, Felder, from S.-W. Sumatra; and (*d*), *T. helena cerberus*, Felder, from Sumatra.

570. TROIDES (*Pompeoptera*) AMPHRYSUS, Cramer.

Grose Smith. Hagen as *amphrysus*, var. *rubricollis* [sic]; and *amphrysus*, var. *ruficollis*. This species was originally described from a male from Batavia in Java. *T. ruficollis*, Butler, was described from Malacca in the Malay Peninsula. I can find no constant character by which to separate these two species, and Mr. Butler in his original description of the latter does not say how they are supposed to differ. Heer P. C. T. Snellen says also that the two species are identical. It occurs in Sumatra throughout the year in the plains and on the outer ranges of the hills, but not higher than Bekantschan, and is commoner than *T. helena*, Linnæus. Dr. Martin has twice bred it, the larva feeding on a creeper with large trilobate leaves. The egg is spherical and yellow, and in three or four days the caterpillars emerge. When full grown the larva is of a coffee-brown colour, and has on each segment four, five, or seven fleshy processes, those on the first four segments (omitting the head) are apically thickened and rounded and are bent backwards, on the other segments they are directed forwards. The larvæ devour not only the leaves, but also the bark and soft shoots of their food-plant if there are no more leaves to eat, and make a very audible noise while eating, just as the larvæ of large *Saturnias* do. They are very delicate, and especially so when they have fixed themselves for their transformation to the pupa state, when on no account should they be touched. The pupa is yellow, is dorsally notched, and is suspended by a black median silken girth. If the pupa is touched, disturbed in any way, or even blown upon, it makes quite a loud noise by moving the abdominal segments one over the other, which noise is so loud that it is probably sufficient to scare away some of its enemies. After from 26 to 29 days the imago emerges, which is the longest pupal rest known to us for purely tropical butterflies—at least as regards all such species as we have bred. Even the large *Papilios* such as *P. memnon*, Linnæus, do not remain more than 15 or 16 days in the pupal stage. Rothschild

records (c) *T. amphrysus flavicollis*, Druce, (*b*²), ab. *ruficollis*, Butler, from Sumatra.

571. *TROIDES (Pompeoptera) CUNEIFERA*, Oberthür.

Ornithoptera amphrissus, Fabricius, ab. *cuneifera*, Oberthür, Etudes d'Ent., vol. iv, p. 110, n. 9 (1879).

Papilio (Ornithoptera) ritsemæ, Snellen, Notes from the Leyden Museum, vol. xi, p. 153 (1889).

Ornithoptera ritsemæ, var. *sumatrana*, Hagen, Iris, vol. vii, p. 19, n. 5 (1894).

Hagen as *ritsemæ*, var. *sumatrana*. Found from January to July only at high elevations to the south of Bekantschan and at Soengei Batoe. It is rare, as Dr. Martin in thirteen years obtained only three males and two worn females. He notes "That the Sumatran race of *T. ritsemæ*, originally described from Java, differs from Javan specimens in not having the two cuneiform velvety dark brown spots on the upperside of the abdomen; the forewing is coloured and marked exactly like Javan examples; the hindwing has the submarginal row of dusky powdered spots so very conspicuous and complete in Javan specimens very slightly indicated, faint, and reduced to one or two only, in Sumatran examples." Rothschild does not allow this species specific rank, but gives it in his exhaustive paper in "Novitates Zoologicae," vol. ii, p. 232 (1895), entitled "A Revision of the *Papilios* of the Eastern Hemisphere, exclusive of Africa," under *Troides amphrysus*, Cramer, as (*d*), *T. amphrysus sumatranus*, Hagen. Unfortunately this paper only reached me when the whole of the present article was in print, so that on this occasion I am not able to give it full justice.

All *Troides* are true inhabitants of the forest, but the yellow species (*Pompeoptera*) in both sexes are very fond of flowers, *Hibiscus*, *Ixora*, and *Poinciana pulcherrima*, and so approach houses and are seen in the gardens, but they never settle on roads. *T. brookiana* (*Trogonoptera*) on the contrary never settles on flowers, but only on damp spots on roads and also near houses on manure heaps and kitchen middens. All of them were very appropriately named generically *Ornithoptera* by Boisduval, as on the wing they really look very much like birds, especially *T. brookiana*, which when sailing high over a road or in the forest has a most striking resemblance to the small and common Swift of the tropics. Usually they fly slowly, but if pursued their flight becomes extremely rapid, so that they are soon borne out of reach and sight. They never entirely settle on flowers, but seize them with their forelegs, they float above the flower by gently moving the wings for a few seconds, when they seek another. They are strong fliers, as the females in especial have to make long journeys to find the rare food-plant, when so flying they keep high up in the air, doubtless to

overlook a large stretch of jungle. All *Troides* are early risers, and are already out at 7 o'clock in the morning; in the hottest hours of the day they are rarely seen, but appear again late in the evening at 5 or 6 o'clock, when with the exception of some *Satyrinæ*, *Amathusiinæ* and *Hesperiidæ* all other butterflies have gone to rest long ago. Mr. Walter Rothschild refers to the Malay Peninsula local race as *T. brookianus albescens*.

572. *PAPILIO* (*Menelaides*) *ANTIPHUS*, Fabricius.

P. antiphus, Hagen, *Iris*, vol. vii, p. 20, n. 12, pl. i, fig. 1, larva (1894).

Grose Smith. Snellen as *anthipus* [sic]. Hagen. Staudinger. In *Trans. Linn. Soc. Lond.*, first series, vol. xxv, p. 20 (1865), Dr. Wallace records *P. diphilus*, Esper, = *P. aristolochiæ*, Fabricius, from Sumatra, but this probably in error, as on page 43, n. 26 (*l. c.*) he omits Sumatra from the habitat of the species. It is not a little remarkable I think that *P. diphilus* should occur commonly in the Malay Peninsula and Java, between which Sumatra lies, but not in Sumatra itself, it being replaced by the present species. In Java both *P. diphilus* and *P. antiphus* are found. In Sumatra *P. antiphus* flies in the plains throughout the year and quite near the sea, is common at Laboean and Terdjoen, but certainly not much higher than Namoe Oekor. It is seen on roads, in gardens and orchards, near rivers, is plentiful on the above-mentioned *Veronica*-like blue flower, but not in large forest. It flies slowly and sails near the ground, and is the most common *Papilio* of Sumatra next to *P. polytes*, Linnæus. The larva is velvety black, with numerous black red-tipped fleshy tubercles or processes, the sixth segment is milky-white much as in *P. erebus*, Wallace. It feeds according to Dr. Hagen on the same *Piperacea* as *P. erebus*, Wallace, but Dr. Martin has also bred it on the common *Aristolochia indica*, Linnæus, and notes that the full-fed caterpillar feeding on the latter plant is reddish-brown throughout without the milky-white saddle-mark on the sixth segment. The pupa is brown, with blunt notches and protuberances. This larva, like that of *Troides amphrysus*, Cramer, eats not only the leaves but also the stalks of the food-plant. Rothschild does not consider *P. antiphus* to be a species distinct from *P. aristolochiæ*, but records it from Sumatra as (*g*), *P. aristolochiæ antiphus*, Fabricius.

573. **PAPILIO* (*Menelaides*) *COON*, Fabricius.

Grose Smith. Wallace. Distant. There are typical specimens of *P. cöon* in Dr. Staudinger's collection from Padang in Western Sumatra, though the locality is somewhat doubtful, as the specimens may have been obtained from old collections with wrong labels given by dealers. It occurs also in Java and Borneo.

574. *PAPILIO (Menelaides) DELIANUS*, Fruhstorfer.

P. doubledayi, Wallace, var. *delianus*, Fruhstorfer, Ent. Nach., vol. xxi, p. 196 (1895).

Hagen as *doubledayi*. Originally described from Deli in Sumatra. Wallace gives *P. cöon*, Fabricius, from Sumatra, Java, and Borneo, and says that *P. doubledayi*, Wallace, the Indian form, differs from it in having the markings red instead of yellow. The Sumatran form in both sexes has the markings at the anal angle of the hindwing distinctly red, while *P. cöon* from Java has them equally distinctly yellow. The abdomen of our Sumatran examples is, however, more yellow than red. We have thus true *P. cöon* occurring in Sumatra, and also an intermediate form between that species and the continental *P. doubledayi*, shewing the exact region where the one species is gradually becoming transformed into the other. *P. delianus* is rare in the forests of the plains and outer hills, is found at Selesseh, Namoe Oekor, and as high only as Bekantschan. It chiefly frequents the flowers of high trees and so is seldom caught. It has a fluttering but quick flight. Dr. Martin has specimens from so far south as Asahan. Rothschild does not allow *P. delianus* full specific rank, but records it as *P. cöon*, Fabricius, (*d*), *P. doubledayi delianus*, Fruhstorfer.

575. *PAPILIO (Menelaides) NEPTUNUS*, Guérin.

Hagen as *neptunus*, var. *sumatrana*, Hagen. The Malayan Peninsula form of *P. neptunus* as figured by Distant has four crimson spots on both sides of the hindwing in the male, while the Sumatran form has only two; the female has three spots on both sides in the Malayan Peninsula form, while the Sumatran has two on the upperside and three on the underside. In all other respects the species from these two localities agree as far as I can see. I have not seen specimens from Borneo, from whence *P. neptunus* is recorded by Wallace. It is certainly one of the remarkable butterflies of the world; the anal half of the abdomen in both sexes being of a bright chrome-yellow colour is in unique and startling contrast to the rest of the black abdomen and the black wings with the crimson spots on the hindwing. No doubt this staring yellow-tipped abdomen serves as a very efficient danger-signal or warning-colour to the enemies of butterflies to leave this particular species severely alone, the butterfly being obviously a protected one and with a very strong scent. It is quite as rare as *P. delianus*, Fruhstorfer, and is found in the same localities. Its flight is very slow and sailing, always high in the air and out of reach of the net. It is almost impossible to obtain perfect specimens. Rothschild records this species from Sumatra as *P. neptunus*, Guérin, (*a*²), ab. *sumatranus*,

Hagen, and notes that "This aberration is *not* confined to Sumatra, but seems to be there the usual form."

576. **PAPILIO (Pangerana) PRIAPUS*, Boisduval.

Grose Smith. Wallace. Kirby. As far as I am aware, this species is confined to Java and Borneo (Rothschild, however, says that it "Does certainly not occur in Borneo"), but it is possible that it may be found in the extreme south-east of Sumatra adjoining Java. Dr. Wallace places it in the *memnon* group, but as the males differ greatly in shape from all the species of that group, and moreover have the abdominal margin of the hindwing folded over anteriorly twice as in the species of the *nox* group, *P. priapus* appears to me to be better placed in the subgenus *Pangerana*, Moore, of which *Papilio varuna*, White, is the type, and which will probably embrace *P. nox*, Swainson, and its allies. All the species of this group, as well as all *Troides*, have as imagines a very strong scent, and are certainly highly protected.

577. *PAPILIO (Pangerana) SYCORAX*, Grose Smith.

P. (Pangerana) sycorax, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. viii, p. 54, n. 15, pl. M, fig. 1, male (1893).

Grose Smith. Distant. Hagen. Originally described from Sumatra, but found also in the Malay Peninsula. In Sumatra it flies from Bindjei to south of Bekantschan, but not on the Central Plateau. We have numerous specimens from Selesseh, and Dr. Martin took it himself at Quala Minchirim near Bindjei, and at Roemah Kenangkong near Toentoengan, throughout the year. Dr. Hagen has quite recently caught it in Redjang in Southern Sumatra. It has a bold and high flight like a *Troides*, and is not easily captured, but in the forest near Selesseh there was a tree of *Jambosa aquæa*, Rumph., in flower, on which in July, 1893, the collectors obtained considerable numbers of both sexes by using a long bamboo-handled net. *P. erebus*, Wallace, *P. sycorax*, and *P. hageni*, Rogenhofer, are all apparently commoner in the female than in the male sex, which is the reverse of nearly all other species of *Papilio*. Herr Puttfarcken has observed a female of *P. sycorax* depositing eggs on a lime tree (*Citrus* sp.) at Bandar Quala in Serdang.

578. *PAPILIO (Pangerana) HAGENI*, Rogenhofer.

P. (Pangerana) hageni, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. viii, p. 55, n. 16, pl. M, fig. 2, female (1893); idem, id., Journ. A. S. B., vol. lxiii, pt. 2, p. 45, n. 39, pl. iv, fig. 6, male (1894).

Rogenhofer. Hagen. Originally described from Sumatra, where

it flies throughout the year on the Central Plateaus of Tobah and Karo only rarely, the male even rarer than the female. Dr. Hagen has seen it on the wing, and describes the flight as “*memnon*-like;” it frequents the flowers of *Pavetta*. This butterfly as well as *P. sycorax*, Grose Smith, by reason of their curious white wigs proved very attractive to the Malay collectors, so they awarded them the name “Kapala Putih,” which means “White Head.” It may however have been due to the fact that they received an extra douceur for every Kapala Putih they caught that they took such interest in these two particular species.

579. *PAPILIO* (*Pangerana*) *EREBUS*, Wallace.

P. erebus, Hagen, *Iris*, vol. vii, p. 26, n. 25, pl. i, fig. 2, larva (1894).

Hagen as *noctis* and *erebus*. The *P. noctis* of Hewitson appears to be a distinct species confined to Borneo. *P. erebus* occurs in Sumatra throughout the year, as we have specimens caught in every month. It is absolutely restricted to the forest, and even there does not go to roads or rivers, but flies slowly through the thickest undergrowth, where it avoids the net very cleverly by its highly irregular and erratic flight, and by dodging amongst the bushes, consequently really perfect specimens are hardly ever obtained. The males are much rarer than the females, but may sometimes be caught on the borders of the forest on the sweet smelling *Veronica*-like blue flower of a small tree. The larva has been figured by Dr. Hagen, is brown with black markings, the sixth and seventh segments with a white saddle-like band, and the whole body is furnished with long fleshy tentacles very similar to those in *Troides*. It feeds on a *Piperacea* called “Dahoen Peandang” by the Malays. Dr. Martin saw three larvæ in Dr. Dohrn’s possession in February, 1895. The pupa, according to Dr. Hagen, is exactly like that of the Javan *P. nox*, Swainson.

580. *PAPILIO* (*Araminta*) *DEMOLION*, Cramer.

Grose Smith as *demoleon* [sic]. Snellen as *demolion*, Linnæus [sic]. Hagen. Wallace. Staudinger. Distant. Flies from March to July in the forests of the outer hills, from Selesseh to south of Bekantschan; is rather rare in our area; the males have a very quick and restless flight and frequent flowers, on which they do not settle, but abstract the honey while hovering. The larva feeds on *Citrus*, and is very similar to that of *P. polytes*, Linnæus, but is of a darker green colour. In Java it is very plentiful near Semarang.

581. *PAPILIO (Charus) HELENUS*, Linnæus.

Grose Smith. Snellen. Hagen. Wallace. Butler. Distant. Dr. Wallace separates off the Sumatran and Javan form of *P. helenus* from the North Indian form as a "Local form b," differing in being "Smaller; the third and fourth lunules from the anal angle beneath very small or quite absent." Next to *P. polytes*, Linnæus, and *P. antiphus*, Fabricius, this is our most common *Papilio*, a true inhabitant of the forest, found over the whole of our area, even on the Central Plateau, but most plentiful on the outer hills. The male has a quick and powerful flight, and frequents flowers and wet spots on forest roads. The female is rarer, and must be looked for in the forest when depositing her eggs. The larva is most common in February on different species of *Citrus*, it is superficially very similar to that of *P. memnon*, Linnæus, but is somewhat smaller and has brownish-red lateral streaks. The pupa is smaller and much more slender, but is coloured like that of *P. memnon*. The imago emerges in from 14 to 15 days. Rothschild records this species from Sumatra as (e), *P. helenus palawanicus*, Staudinger.

582. *PAPILIO (Charus) ISWARA*, White.

Hagen. Very rare in our area, more common on the western boundary, as most of the specimens received have been from the Gayoe-lands. Occasionally taken at Selesseh and Besitan. Found in the plains and outer hills. During a short collecting trip in Indragiri in the middle of Sumatra, Dr. Friedl Martin found this species very plentifully in February, 1895, but not a single specimen of *P. helenus*, Linnæus, was observed.

583. *PAPILIO (Charus) NEPHELUS*, Boisduval.

Grose Smith. Hagen as *albolineatus*, Fabricius [sic]; *nephelus*; and *nephelus*, var. *saturnus*. Wallace. Staudinger. Distant as *nephelus*, var. *saturnus*. Forbes as *saturnus*. Butler as *saturnus*. Distant notes that in a Sumatran specimen of this species in his collection "The pale stramineous markings above are more or less shaded with dark ochraceous." This remark probably applies to a female. *P. albolineatus*, Forbes, was described from Borneo, and is figured in Aid, vol. ii, pl. clxvi, fig. 1. We have seen no specimen of it from Sumatra, though Dr. Hagen has recorded it from thence. *P. nephelus* is rarer than *P. helenus*, Linnæus, and occurs throughout the year in the plains and on the outer hills, but not on the Central Plateau. It is also a true forest butterfly; the males have a very quick and restless flight, are fond of flowers, but settle only for a very brief period; never observed

on roads. The larva feeds on different species of *Citrus*, the larva and pupa being practically identical with those of *P. helenus*, so that it is only when the imago emerges that one is able to know with certainty which species is being bred. The pupal state lasts about a fortnight. Rothschild records it from Sumatra as (*b*), *P. nephelus saturnus*, Guérin, (*a*²), ♀ -ab. *albolineatus*, Forbes.

584. *PAPILIO* (*Charus*) *DIOPHANTUS*, Grose Smith.

P. diophantus, Grose Smith and Kirby, Rhop. Ex., vol. i, pl. *Papilio* i, figs. 4, male; 3, female (1887).

Grose Smith. Hagen as *diaphantus* [sic].

HABITAT: N.-E. Sumatra.

EXPANSE: ♀, 4·7 inches.

DESCRIPTION: FEMALE. Differs from the male in being larger. UPPERSIDE, *both wings* paler. *Forewing* with a diffused discal macular pale ochreous band from the inner margin to the lower discoidal nervule. *Hindwing* with the large quadrifid whitish patch of a deeper and more ochreous colour than in the male, and continued to the abdominal margin in a narrow decreasing deep ochreous band. UNDERSIDE, *both wings* as in the male.

Restricted to Sumatra, and found, like *P. forbesi*, Grose Smith, only on the Central Plateau not below 3,000 feet. The males on sandy river beds throughout the year. The female is very rare, Dr. Martin obtained two or three only in thirteen years. Messrs. Grose Smith and Kirby say that their fig. 3 is taken from a female. If this is so (it looks like a male) it differs greatly from the female described above by me.

585. *PAPILIO* (*Iliades*) *MEMNON*, Linnæus.

Grose Smith. Snellen. Hagen as *memnon* and *esper*i. Wallace. Staudinger. Kirby. In Sumatra the female of this species is represented by four distinct forms:—

I. Tailless, nearest to the male; forewing with a red epaulette, *i.e.*, the base of the discoidal cell on the upperside is red; the disc of the forewing beyond the discoidal cell towards the apex is whitish, there are all gradations from a few whitish streaks only between the veins to a large apical white area bearing a few black streaks and crossed by the black veins, the extreme apex of the wing is always dusky. Abdomen quite black, with the exception of the extreme apex which is yellow. This form from Sumatra is figured by Wallace in Trans. Linn. Soc. Lond., Zoology, first series, vol. xxv, pl. i, fig. 3 (1865).

II. Tailless; forewing with a creamy-white epaulette; the disc

of the forewing beyond the discoidal cell towards the apex not whitish, but nearly as dark as in the male, but of a somewhat duller shade. Hindwing has the abdominal margin on the upperside yellow. The posterior moiety of the abdomen rich chrome-yellow.

III. Tailless; forewing with a red epaulette; the disc of the forewing beyond the discoidal cell towards the apex whitish as in Form I. Hindwing on the upperside with a large outer discal white area, bearing a series of seven submarginal rounded black spots, of which the four posterior ones are somewhat cuneiform in shape, and are surrounded by the white area, the abdominal margin yellow as in Form II. Abdomen as in Form II.

IV. Tailed; the tails shew much variety, being sometimes spatulate, sometimes simple and straight without any apical swelling; forewing with a red epaulette. Hindwing on the upperside with a large discal white area consisting of eight spots, and filling the discoidal cell all except the base; the abdominal margin being yellow. Abdomen entirely yellow except for a dorsal median black streak.

Forms I and II are common, III is rather rare, IV is very rare, Dr. Martin obtaining seven specimens only. Dr. Martin has frequently bred it, and has obtained all four forms of the female from eggs laid by one mother. Four eggs deposited by a tailed female (Form IV), did not yield a single tailed descendant like herself. The larva is green with some whitish lateral streaks and bluish markings. The pupa is suspended on the leaves or stalks of its food-plant, *Citrus limonellus*, Hassk., and *Citrus decumana*, Linnæus, it is green with the upperside yellow: if suspended on wood it is greyish-brown of the same shade as the wood. On one occasion a larva suspended itself on a common blue, white, and red tin of Huntley and Palmer's biscuits, and this pupa was very bright, and exhibited some blue and red tints. After 14–15 days the imago emerges, on one occasion during a most unusual spell of dry weather, one specimen remained 43 days in the pupa stage. This example was a very fine and large tailed Form IV female, but all the other tailed females bred by Dr. Martin emerged as usual in about a fortnight. *P. memnon* is common throughout the year in the plains, not higher than Bekantschan, in gardens and orchards, near houses and villages everywhere where species of *Citrus* grow. It is most plentiful in March. The male has a quick, restless, undulating flight, it frequents flowers, but never goes to wet spots on roads, and is mostly busy in search of the female through the orange and lime thickets round the Malay villages. The female has a slower, more sailing flight, and is often to be seen on lime trees depositing her round green eggs one at a time on young shoots. The full-fed larva from Java has been figured by

Heer M. C. Piepers in Tijds. voor Ent., vol. xxxi, p. 350, pl. viii, fig. 5 (1888).

586. *PAPILIO (Iliades) FORBESI*, Grose Smith.

P. forbesi, Grose Smith and Kirby, Rhop. Ex., vol. i, pl. *Papilio* i, figs. 1, 2, male (1887); id., Martin, Nat. Tijds. voor Neder.-Indië, vol. liii, p. 335, n. 2 (1893).

Grose Smith. Hagen. The male is somewhat variable, on the upperside of the hindwing in some specimens the usual four anal grey lunules are almost obliterated. There are two forms of female:—

I. Forewing almost as in the male, somewhat paler only except the inner margin broadly towards the base. Hindwing with the anal half not quite touching the discoidal cell creamy-white, this area ending anteriorly at the second subcostal nervule; bearing in the submedian interspace an oval black spot which inwardly touches the narrow black abdominal margin, two conical equal-sized spots in the median interspaces, a conical but smaller spot than the two which precede it in the discoidal interspace; the margin bears five large black spots, of which those in the median interspaces alone are free. Underside, forewing somewhat paler than in the male. Hindwing has the basal red streaks as in the male, the large creamy-white area spotted with black as on its own upperside, but in the upper subcostal interspace there is an additional oval small whitish spot crowned with a few turquoise-blue scales, with some similar scales in the interspace above.

II. Similar to Form I, but the forewing has a creamy-white epaulette as in the Form II of the female of *P. memnon*, Linnæus, in Sumatra. It is possible that this form of *P. memnon* may mimic Form II of *P. forbesi*.

P. forbesi is found on the Central Plateau only, at a not less elevation than 3,000 feet above the sea, and flies all through the year. The male is common, and is caught on the sandy banks of hill streams; the female of both forms is excessively rare, Dr. Martin obtaining five specimens only. The first male was obtained by Mr. H. O. Forbes near Lake Ranau in Benkoelen quite in the south of Sumatra, the females described in 1893 by Dr. Martin were obtained in the previous year.

587. *PAPILIO (Laertias) POLYTES*, Linnæus.

Snellen as *pammon* and *polytes*. Grose Smith as *pammon* and *polytes*. Hagen. Wallace as *theseus*. Kirby as *numa*, Weber, and *antiphus*, De Haan (*nec* Fabricius). Distant. Dr. Wallace separates off the Sumatra, Java, Borneo, Celebes, Lombok, and Timor form from the India, Ceylon, China, and Malay Peninsula form, true *P. polytes*, under the name of *P. theseus*, Cramer, which differs in the male being

“Smaller, and the tail always reduced to a projecting tooth.” Neither of these characters is constant, in specimens from N.-E. Sumatra the length of the tail especially is very variable, and it is often quite as long as in Indian specimens. In Sumatra *P. polytes* has two forms only of female:—

I. Very similar to the male.

II. Mimicking *P. antiphus*, Fabricius. This is the *P. theseus* of Cramer, Pap. Ex., vol. ii, pl. clxxx, fig. B (1777), described from the west coast of Sumatra; it is also figured by Wallace in Trans. Linn. Soc. Lond., first series, vol. xxv, p. 52, n. 63, pl. ii, fig. 7 (1865), from Sumatra. This form has practically no white spots on the disc of the hind-wing as in the corresponding second form of the female of the Indian *P. polytes*, which there mimics *P. aristolochiæ*, Fabricius, a butterfly which in Sumatra is replaced by *P. antiphus*, though very rarely there is just a trace of a whitish spot in the discoidal cell. *Papilio numa*, Weber, was described from Sumatra, from the description it would appear to be the ordinary second form of the female of *P. polytes* found in India, so Weber's habitat is almost certainly incorrect. *P. polytes* is the most common *Papilio* of our area, and occurs probably everywhere except at the higher elevations and on the Central Plateau. It flies in gardens, orchards, on roads, near rivers, houses, and villages, and is always to be seen in the neighbourhood of lime trees. The females prefer to lay their eggs on young and low trees of species of *Citrus*, and deposit three or four eggs only on each bush. The young larvæ, like those of *P. memnon*, Linnæus, *P. helenus*, Linnæus, and *P. nephelus*, Boisduval, have a strong superficial likeness to a bird's dropping, which doubtless at this stage greatly protects them. The pupal stage is eleven days only. Heer M. C. Piepers has bred it in Java, and has figured three stages of the larva in Tijd. voor Ent., vol. xxxi, p. 352, pl. viii, figs. 6, 7, 8 (1888). Rothschild records it from Deli, Sumatra, as *P. polytes*, Linnæus, typical form; also as *P. polytes theseus*, Cramer, (*g*¹), ♀-f. *javanus*, Felder, from Sumatra, rare; also as *P. polytes theseus*, Cramer, (*i*¹), ♀-f. loc. *theseus*, Cramer, common.

588. *PAPILIO (Menamopsis) PERSES*, de Nicéville.

P. (Menamopsis) perses, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 46, n. 40, pl. iv, fig. 7, *male* (1894).

P. hewitsonii, Westwood, var. *sumatrana*, Hagen, Iris, vol. vii, p. 20, n. 11, (1894).

Hagen as *hewitsonii*, var. *sumatrana*. Also very rare, six specimens only in thirteen years, on high elevations not below 3,000 feet on the Central Plateau of the Karo Battaks and in the Gayoe territory in

November and January. The Hon. Walter Rothschild in *Novitates Zoologicae*, vol. ii, p. 362 (1895), records this species as *P. slateri perses*, de Nicéville, from North-Eastern Sumatra. Neither Dr. Martin or I can agree with him in sinking *P. hewitsoni*, Westwood, from Borneo, and *P. perses* as sub-species of *P. slateri*, Hewitson, from N.-E. India, and *P. tavoyanus*, Butler, from Burma. The two latter have extensive blue markings on the upperside of the forewing, which the two former entirely lack, and no intergrades between them have been found, so we think that *P. hewitsoni* should stand as a full species, with *P. perses* as a local race.

589. *PAPILIO (Menamopsis) PETRA*, de Nicéville.

P. (Menamopsis) petra, de Nicéville, *Journ. A. S. B.*, vol. lxiii, pt. 2, p. 47, n. 41, pl. iv, fig. 5, *male* (1894).

Described from a single example from the Gayoe mountains taken in January, 1893. No specimens have been obtained since. Rothschild records this species as (c), *P. slateri perses*, de Nicéville, (*a*²), ab. *petra*, de Nicéville. He may be correct in assigning it to the position of an aberration only, but as the type is unique, it may be kept distinct for the present till further specimens are obtained and we know more about it. Mr. Rothschild's note is as follows:—"This insect has been discovered in the same district where *P. perses*, de Nicéville, was obtained, and it is most probably nothing but an atavistic example of the latter, provided it has the same structural characters as *P. slateri*, Hewitson. I have not had the opportunity to examine a specimen of this aberration." (*Nov. Zool.*, vol. ii, p. 363 (1895).

590. *PAPILIO (Euplæopsis) BUTLERI*, Janson.

Grose Smith as *paradoxa*. Wallace as *paradoxa*, local form *b*. Hagen as *paradoxa*, var. *zanao*. Dr. Wallace describes this species from Sumatra without naming it as follows:—"Smaller than *P. paradoxa*, Zinken-Sommer, from Java and Borneo; intermediate in the markings between the Java and Borneo forms; interior row of elongate marks on the upperside of the forewing light blue, not descending to the outer angle." Mr. Butler has described and figured three species of the *paradoxa* group from Sarawak in Borneo, viz., *P. zanao*, *P. kerosa*, and *P. juda*. Without having the actual types to compare with Sumatran specimens, it is difficult to say if any of these supposed distinct species are the same as *P. butleri*; they are all obviously very nearly allied to that species and to one another. *P. butleri* was described from Malacca, and is recorded by Distant from Province

Wellesley and Kwala Lumpor in Selangor also in the Malay Peninsula. I possess two specimens from Quang and Kwala Lumpor. Sumatran specimens agree fairly well with Malay Peninsula ones, and with Distant's figure of the species, pl. xxviii, fig. 6, *male*. Both sexes mimic the corresponding sexes of *Euplœa linnæi*, Moore. Dr. Martin has obtained two females only of *P. butleri*, which mimic the female of *E. linnæi*. It is rare in the plains and outer hills, near Selesseh, in Padang Bedagei and Asahan, also in the Gayoe territory, but certainly not much higher than Bekantschan, and flies from January to June and again in September, but in no other months. The males if undisturbed are on the wing exactly like *E. linnæi*, but as soon as they scent danger they assume the typical rapid flight of a *Papilio*. They are very fond of wet-swampy spots on roads in the forest. The females are very scarce. Dr. Martin's brother bred it in Asahan in 1891 from larvæ found on a low shrub (not a creeper) in the forest; they were velvety black with fleshy red tubercles. The pupa, suspended by a black median girth, adheres by the three posterior abdominal segments to a branch of the food-plant, and looks like an obliquely cut off bit of stick as do the pupæ of all this group. The pupa is quite rigid, and has no motion in the abdominal segments whatever.

591. *PAPILIO* (*Euplœopsis*) *ÆNIGMA*, Wallace.

P. ænigma, Wallace, Trans. Linn. Soc. Lond., Zoology, first series, vol. xxv, p. 60, n. 83, pl. vii, fig. 3, *male* (1865).

Described by Wallace from Malacca, Sumatra, and Borneo. The specimen figured is from Sumatra. It is possible that the butterfly figured by Distant in Rhop. Malay., pl. xxvii, fig. 6, as the female of *P. butleri*, Janson, is the true female of *P. ænigma*. (Wallace records that species from Malacca as noted above, but Distant concludes that the Malaccan specimen so identified is the *P. butleri* described subsequently as a distinct species.) It is extremely difficult to say who is right, Wallace or Distant; the butterflies of this group are excessively rare, so that it is almost impossible to get together sufficient material to decide the point. Dr. Martin has two females only, one taken on the outer hills south of Namoe Oekor, in December, the other in Indragiri in the middle of Sumatra, in February. These specimens agree with Distant's figure above quoted, and I prefer to consider them to represent *P. ænigma* rather than to be a dimorphic form in the female of *P. butleri*. Dr. Martin, as noted above, possesses the ordinary form of the female of *P. butleri* which mimics the female of *Euplœa linnæi*, Moore, and was unknown to Distant.

592. *PAPILIO (Euplaeopsis) PENOMIMUS*, Martin.

P. penomimus, Martin, Einige neue Tagschmetterlinge von Nordost-Sumatra (Munich), pt. 1, p. 2, n. 2 (1895).

This butterfly, though it has the *facies* of the species included in the *dissimilis* group (subgenus *Chilasa*), may belong to the *paradoxa* group (subgenus *Euplaeopsis*), as it has the hindwing at the termination of the upper subcostal nervule produced, that being a characteristic feature of the species of the latter group. *P. penomimus* reminds one somewhat of *P. ramaceus*, Westwood, Trans. Ent. Soc. Lond., 1872, p. 95, pl. v, fig. 3, from Borneo, which species, however, is placed by Rothschild under *P. leucothoë*, Westwood. It is very rare in the forests of the plains and on the outer hills, occurs near Selesseh, at Bekantschan, and at Bandar Quala in Serdang from January to March and again in June. Dr. Martin bred it from some larvæ found by Herr O. Puttfarcken at Bandar Quala in Serdang in May, 1894. They feed on a low shrub in the forest called by the Malays "Dahoen Laksah," are velvety green and deep indigo blue, with round lateral red spots, and short fleshy tubercles. The pupa is similar to that of *P. butleri*, Janson, being suspended by a black girth to a stalk of the food-plant, the three posterior abdominal segments greatly flattened on the side touching the stick. As the stalk was still green, the pupa also was mostly green with brown and white markings. The imago emerged in 16 days.

From what I can gather from Mr. Rothschild's paper on *Papilios*, the three last named species all belong to *P. paradoxus*, Zinken-Sommer, sub-species *telesicles*, Felder. Mr. Rothschild's collection appears to contain only three males and one female of the group from Sumatra, of which he enumerates the female as *P. paradoxus telesicles*, Felder, (r^2), ♀ -ab. *daja*, Rothschild. He does not say what his males are. When he wrote his paper Dr. Martin's description of both sexes of *P. penomimus* had not reached him. Dr. Martin writes to me that after examining Dr. Staudinger's collection at Dresden, he considers that the three species we have enumerated above are all one, and that in Sumatra it is trimorphic in the female. What he has described as the male of *P. penomimus* is an error, all his specimens of that species being females. Rothschild names Distant's figure in Rhop. Malay., pl. xxviii, fig. 6, male " (n^2) , ab. *distanti*"; and Distant's figure pl. xxvii, fig. 6, female, " (u^2) , ab. *nepticula*." As regards *P. ænigma*, Wallace, Rothschild records it as " (q^2) , ♂ -ab. *ænigma*, Wallace."

593. *PAPILIO (Euplaeopsis) ÆGIALUS*, Distant.

P. velutinus, Butler, Ann. and Mag. of Nat. Hist., fifth series, vol. xvi, p. 343 (1885).

Grose Smith as *caunus*. Wallace as *caunus*. Butler as *velutinus*.

Originally described from the Malay Peninsula and is a local race of *P. caunus*, Westwood, of Java. It is one of a group which are amongst the most perfect mimics known, their models being the different local races of *Euploea diocletianus*, Fabricius. It is very rare, Dr. Martin in thirteen years has obtained two specimens only, both males, in forest near Selesseh, the first on 23rd April, 1893, the second on 15th July, 1894. The first was captured by a very clever Chinese collector, who watched and followed the butterfly for nearly half the day before he was able to catch it. He correctly took it for a *Papilio*, but thought it might be a female of *P. butleri*, Janson. Rothschild records this species from Sumatra as *P. caunus ægialus*, Distant, and notes that "The type-specimen of *P. ægialus*, Distant, now in my collection, does not differ from that of *P. velutinus*, Butler, in the British Museum, except in the submarginal markings of the hindwing, which are a little smaller in *P. velutinus*; one of my three *P. ægialus* from the Malay Peninsula has these spots, however, not larger than the type of *P. velutinus*."

594. *PAPILIO (Achillides) ARJUNA*, Horsfield.

P. arjuna, Horsfield, var. *gedeensis*, Fruhstorfer, Ent. Nach., vol. xix, p. 287 (1893); idem, id., Stet. Ent. Zeit., vol. lv, p. 118 (1894).

Wallace. Hagen. Staudinger. Herr H. Fruhstorfer has recently described not only *P. gedeensis* from W. Java and Sumatra, but also *P. prillwitzii* from W. Java, and *P. tenggerensis* from E. Java, while admitting the occurrence of *P. arjuna* also in Java. I have not sufficient material to form an opinion as to whether or not all these four species (five including *P. karna*, Felder), all closely allied, and from one island, are distinct and valid. Herr Fruhstorfer has sent me specimens of *P. gedeensis* from Java which agree with my Sumatran examples of *P. arjuna*. They differ from Horsfield's figure of the latter in lacking a pale green band across the disc of the forewing on the upperside. In Sumatra specimens are found with and without the green band; the latter are the commoner. Further observations appear to be necessary before Herr Fruhstorfer's species can be accepted. *P. arjuna* in Sumatra is restricted to the Central Plateau, where it is common and flies throughout the year, as the collectors brought in specimens in every month. Is not nearly so shy or quick on the wing as *P. palinurus*, Fabricius. Rothschild places *P. tenggerensis* as a pure synonym of *P. arjuna*; he gives *P. gedeensis* as *P. arjuna*, Horsfield, (a^2), ab. *gedeensis*, Fruhstorfer; and allows *P. prillwitzii* full specific rank.

595. *PAPILIO* (*Achillides*) *KARNA*, Felder.

P. (Achillides) discordia, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. vii, p. 343, n. 17, pl. I, fig. 2, male (1892).

Hagen as *karna*. When describing this distinct species I overlooked *P. karna*, Felder, described from Java, as Mr. Kirby had placed it in his Synonomic Catalogue as a "var." of *P. arjuna*, Horsfield, instead of admitting its undoubtedly valid specific rank as he should have done. It is very rare, and occurs on the western boundary of our area in the Gayoe territory, from whence in thirteen years Dr. Martin obtained only ten specimens in the months of January and May. This fine species is much larger than *P. arjuna*. Mr. Rothschild considers *P. karna* to be a sub-species only of *P. arjuna*, and records it from Sumatra as (*b*), *P. arjuna karna*, Felder.

596. *PAPILIO* (*Harimala*) *PALINURUS*, Fabricius.

Grose Smith as *palinurus* and *brama*. Hagen as *palinurus* and *brama*. Wallace as *brama*. Butler as *brama*. Distant as *brama*. Kirby as *palinurus*, De Haan (*nec* Fabricius). No author as far as I am aware has ventured to point out how *P. palinurus*, Fabricius, and *P. dædalus*, Felder, are supposed to differ. Dr. Wallace in his paper on the *Papilionidæ* of the Malayan Region keeps *P. brama*, Guérin, described from the Malayan Coast, and *P. dædalus* distinct, but does not mention *P. palinurus* at all. The latter was described by Fabricius from Tranquebar. *P. palinurus* is found in Burma, the Malay Peninsula, Sumatra, Borneo, and the Philippine Isles, *P. dædalus* in the Philippines. A closely allied species is *P. crino*, Fabricius, erroneously described from Africa, but found from Northern India to Ceylon. I have a good series of *P. palinurus* from all the localities above named, and can find no single character by which to separate them. The exact position of the discal green band on the upperside of the hindwing seems to be inconstant, in some specimens it reaches well into the discoidal cell, in others it is bounded by the disco-cellular nervules. In Sumatra *P. palinurus* is found in the plains only of Deli and Langkat, occurring throughout the year, and is decidedly rare, but is somewhat commoner in Serdang. It flies in the forest and settles on wet spots on forest roads. It is fond of flowers, *Ixora*, *Lantana*, &c., goes to gardens, and is very shy and quick on the wing. It is not protected against birds, as Dr. Martin has often picked up wings without body.

597. *PAPILIO* (*Meandrusa*) *PAYENI*, Boisduval.

Grose Smith. Hagen. *P. evan*, Doubleday, from N.-E. India, is a

local race of *P. payeni*, Boisduval, from which it differs chiefly in being larger. *P. payeni* was originally described from Java. Rare at high elevations, not below 2,000 feet in the Battak and Gayoe mountains in March and September. Only five specimens obtained in thirteen years. Rothschild records it from Sumatra and Borneo as (b), *P. payeni brunei*, Fruhstorfer, Ent. Nach., vol. xx, p. 300 (1894), originally described from Brunei, North Borneo.

598. *PAPILIO (Pathysa) ANTIPHATES*, Cramer.

P. itam-puti, Butler, Nat. Wand. in East. Arch., p. 276 (1885).

Snellen. Hagen as *antiphates*; and *antiphates*, var. *pompilius*. Wallace as *antiphates*, local form a, *Podalirius pompilius*, Swainson. Distant as *antiphates*, var. *pompilius*. This is a very variable species wherever it occurs, and as the variations found do not appear to be restricted to geographical areas, it does not seem possible to break up the parent species described from China into local races. It is common over the whole of our area, in and near forest, and throughout the year, but most abundant in March. The males come in crowds to wet spots on roads, and settle among a number of *Pierinæ*, where they evidently feel protected as they also have white wings; when on the wing they look like a "White," as their long tails when flying rapidly can hardly be seen. The females are only caught in the forest as they do not come to roads. Heer M. C. Piepers has bred it in Java, and has figured the larva in Tijds. voor Ent., vol. xxxi, p. 349, pl. viii, fig. 4 (1888). Rothschild records the typical race of *P. antiphates* from Eastern China; the Sumatran form as a subspecies, (b), *P. antiphates alcibiades*, Fabricius; with an aberration which "Seems to be the usual form in Sumatra, but occurs also in other localities," as (c²), ab. *itamputi*, Butler.

599. *PAPILIO (Pathysa) INSULARIS*, Staudinger.

P. agetes, Westwood, var. *insularis*, Staudinger, Iris, vol. vii, p. 349 (1895).

Hagen as *agetes*. Staudinger as *agetes*, var. *insularis*. This species was described from Sumatra interior, and the Kinabalu mountain in Borneo. I allow it specific rank with some misgivings. The Himalayan, Assamese, and Burmese forms (true *P. agetes*) have the second band from the base of the forewing ending at the submedian nervure, in the Malayan Peninsula form it ends in the middle of the submedian interspace (*vide* Distant's figure in Rhop. Malay., pl. xlii, fig. 8), in Sumatran specimens the band is the shortest of all, and ends on the median nervure. All the markings in the Malay Peninsula and Sumatra specimens are darker than in the typical Indian form. But all three forms evidently grade almost imperceptibly the one into the other.

Found only at high elevations, not below 3,000 feet, on the Central Plateau and in the Gayoe mountains, throughout the year, but most abundant in December and January, in which months the Battak collectors brought in hundreds of males. This butterfly, like species of *Charaxes*, very easily rots, as all specimens brought from the mountains if not properly dried at once in the sun or by the fire fall to pieces. Rothschild records this species from Sumatra as (*b*), *P. ageles insularis*, Staudinger.

600. *PAPILIO (Pathysa) HERMOCRATES*, Felder.

Hagen as *anticrates*, var. Flies only in the forests of the plains, where it is very rare. A few specimens only obtained at Paya Bakong near the sea in April, and one from near Selesseh in June. Dr. Hagen had only one specimen from the Gayoe-lands. Rothschild records it from Sumatra as (*d*), *P. aristeus hermocrates*, Felder.

601. *PAPILIO (Zetides) EMPEDOCLES*, Fabricius.

Hagen. This species appears to be migrating westwards, Dr. Wallace in 1865 recorded it from Borneo, it has within the last five years appeared in Sumatra, and in Malacca, Penang and Perak in the Malay Peninsula. In Sumatra only three specimens have been taken in June and December at a high elevation in the mountains. Rothschild records it from Java, Banka Island and Palawan.

602. *PAPILIO (Zetides) EURYPYLUS*, Linnæus.

Wallace as *jason*. Grose Smith as *eurypylus* [sic]. Snellen as *jason*. Hagen as *eurypylus* and *telephus*. Dr. Wallace in Trans. Linn. Soc. Lond., Zoology, first series, vol. xxv, pl. viii, fig. 4 (1865), has figured the outline of the costa of the forewing of this species from Sumatra. Heer M. C. Piepers has bred it in Java, and beautifully figured three stages of the larva under the name of *P. jason*, Esper, in Tijds. voor Ent., vol. xxxi, p. 347, pl. viii, figs. 1, 2, 3 (1888). Rothschild records this species from Sumatra as (*h*), *P. eurypylus axion*, Felder.

603. *PAPILIO (Zetides) MECISTEUS*, Distant.

Hagen. Rothschild does not allow *P. mecisteus* specific rank, he records it as (*h*), *P. eurypylus axion*, Felder, (*b*²), ab. *mecisteus*, Distant.

604. *PAPILIO (Zetides) EVEMON*, Boisduval.

Wallace as *P. jason*, Esper, variety or dimorphic form *a*. Distant. Hagen. Dr. Wallace writes of this species:—"This may be a distinct species, but is more probably a case of dimorphism. The two forms

[*P. jason* and *P. evemon*] are absolutely identical, except that the red spot at the base of the hindwing on the underside, in *P. jason*, Esper, is constantly absent in *P. evemon*, Boisduval." Rothschild gives *P. evemon* full specific rank.

605. *PAPILIO* (*Zetides*) *BATHYCLES*, Zinken-Sommer.

Grose Smith. Hagen. Rothschild records the typical form from Java, and "Most probably also in South-West Sumatra," and the ordinary Sumatran form as (*b*), *P. bathycles bathycloides*, Honrath. These four last mentioned species are all inhabitants of the plains, where they occur throughout the year in and near forest, the males often settled in dozens on wet spots on roads. They are all quick and strong on the wing, but not quite as fast-flying as *P. sarpedon*, Linnæus. If chased away from their favourite spots they behave very like species of *Catopsilia*, and hurry up and down the forest roads in Indian file. *P. mecisteus*, Distant, and *P. bathycles* are somewhat the rarer, the latter is also found at higher elevations than the others, to the south of Bekantschan.

606. *PAPILIO* (*Dalchina*) *SARPEDON*, Linnæus.

Snellen. Hagen. Grose Smith. Wallace. Distant. Common all over our area, from the plains to a high elevation throughout the year on forest roads. The males sit often six or eight together on a wet spot on the road. It has a very strong, quick, and jerking flight. I have figured and described a highly melanic aberration of this species from Sumatra in Journ. Bomb. Nat. Hist. Soc., vol. viii, p. 54, n. 14, pl. L, fig. 11, *male* (1893). Heer M. C. Piepers has bred it in Java, and has figured the two final stages of the larva in Tijds. voor Ent., vol. xxxi, p. 346, pl. vii, figs. 8, 9 (1888). Rothschild records the typical form of the species from Sumatra.

607. *PAPILIO* (*Dalchina*) *CLOANTHUS*, Westwood.

Snellen. Hagen as *cloanthus*, var. *sumatrana*, Hagen. Rothschild records it from Sumatra as (*c*), *P. cloanthus sumatranus*, Hagen. The Sumatran form is slightly more melanic than the typical form from North India and Assam, that is to say, the black areas in the forewing are somewhat larger, thereby reducing the bluish-green markings somewhat. It is almost doubtful if Sumatran specimens could be correctly sorted out from Indian ones if the labels from both were removed and the specimens mixed up. The Western and Central Chinese form, *P. cloanthus*, var. *clymenus*, Leech, is a good local race, and can be distinguished at a glance. In Sumatra *P. cloanthus* is found on the Central

Plateau, not below 3,000 feet, where it occurs not very rarely throughout the year.

608. **PAPILIO* (*Zetides*) *ARYCLES*, Boisduval.

Wallace as *rama*. Butler. As this species occurs in the Malay Peninsula and in Borneo, I have no doubt that Messrs. Wallace and Butler have correctly recorded it from Sumatra, though we have not met with it. The *P. rama* of Felder, is a synonym of *P. arycles*. Since the above was in type I find that Rothschild has four males from Palembang in the south of Sumatra.

609. *PAPILIO* (*Zetides*) *AGAMEMNON*, Linnæus.

Grose Smith. Snellen. Hagen. Wallace. Distant. Dr. Wallace records this species from Malacca, Sumatra, Borneo, and Java as local form c. "Size small; tail very short." The typical form of *P. agamemnon* he gives from India, and Manilla in the Philippine Isles. He has figured the outline of the costa of the forewing of this species from Sumatra in Trans. Linn. Soc. Lond., Zoology, first series, vol. xxv, pl. viii, fig. 6 (1865). Rothschild records the typical form from Sumatra. Heer M. C. Piepers has bred it in Java, and has figured all stages of the larva in Tijds. voor Ent., vol. xxxi, p. 341, pl. vii, figs. 1-7 (1888). It is common throughout the year everywhere in the plains where *Anona muricata* and *Michelia champaca*, Linnæus, the food-plants of the larvæ, are found, and frequents the flowers of the *Lantana*, &c., in gardens and near houses. As the butterfly is found also often in the forest, some wild species of *Anonaceæ* or an allied plant for the larva to feed on must grow there. The full-fed larva exists in two varieties, a bright transparent shining green form, and a yellow form, both having on the first three segments (omitting the head) a horny tubercle with orange base one on each side of each segment. The pupa, which bears a nose-like projection from the thorax directed forwards over the head, is green with some brownish markings, and is suspended by a white girdle. After 15 days the imago emerges from the pupa. The female butterfly prefers young low plants of the *Anona* on which to lay her eggs, as on young newly planted bushes four or five caterpillars are often found together. A "variety" of *P. agamemnon* from Western Java has been described and figured by Heer P. C. T. Snellen in Tijds. voor Ent., vol. xxxvii, p. 71, n. 3, pl. iii, fig. 3, female (1890). It has all the usual macular green markings of the upperside of a deep ochreous colour, probably due to chemical action, possibly that of cyanide of potassium.

610. *PAPILIO (Paranticopsis) XANTHOSOMA*, Staudinger.

P. maccareus [sic], Godart, var. *xanthosoma*, Staudinger, *Iris*, vol. ii, p. 7 (1889).

Hagen as *macareus*, Godardt [sic]; and *macareus*, var. *xanthosoma*. Staudinger as *macareus*; and *maccareus* [sic], var. *xanthosoma*. Occurs throughout the year in the plains (Selesseh and Paya Bakong), on the outer hills, and as far south as Soengei Batoe, also in the Gayoe territory; most abundant in November, March and April. In November, 1894, two Malay collectors brought in 104 male specimens collected in six days from Kepras near Bohorok. We have never seen a female. The male may be a mimic of *Danaïs vulgaris*, Butler, or, as it has a deep yellow abdomen, of *Danaïs banksii*, Moore. They fly exactly like a *Danaïs*, but betray themselves to the collector by coming to wet spots on roads, which *Danaïs* seldom do; also when settled they keep their wings in constant motion, whereas a *Danaïs* always rests with folded motionless wings. Rothschild records this species from Sumatra as (c), *P. macareus xanthosoma*, Staudinger.

611. *PAPILIO (Paranticopsis) LEUCOTHOE*, Westwood.

P. leucothoë, Westwood, var. *interjectus*, Honrath, *Berl. Ent. Zeitsch.*, vol. xxxvii, p. 490 (1893).

Hagen as *leucothoë*; and *leucothoë*, var. *interjectus*. Distant. Staudinger. A variable species as regards the extent of the white markings in all the localities where it is found. Occurs in the forests of the plains (Selesseh), and outer hills (Namoe Oekor), not much higher than Bekantschan; also in Asahan and Indragiri. Rather rare in February and March, and again in September. Its habits on the wing are similar to those of *P. butleri*, Janson. It is doubtless a good mimic of a brown *Euplœa*. Rothschild records it from Sumatra as (b), *P. leucothoë interjectus*, Honrath.

612. *PAPILIO (Paranticopsis) DELESSERTII*, Guérin.

Grose Smith. Hagen as *laodocus*. The *P. delessertii* of Guérin described originally from Pulo-Pinang, has priority over *P. laodocus*, De Haan, by one year. The butterfly is a beautiful mimic of *Ideopsis daos*, Boisduval. The female is paler than the male, from which it may instantly be known by the two spots beyond the discoidal cell bisected by the lower discoidal and third median nervules in the forewing being fused into a large quadrate patch. Found throughout the year in the plains and outer hills, most abundant from February to April, Dr. Martin took it himself near Paya Bakong not far from the sea. Very common on the western boundary of our area at Bohorok

and in the Gayoe territory. The males come to roads and to sandy river banks; the females are very rare, and Dr. Martin obtained three only.

613. *PAPILIO (Paranticopsis) MEGARUS*, Westwood.

Hagen. Very rare in our area, perhaps less scarce on the western boundary, four specimens only obtained from January to March at Kepras and Bohorok. Dr. Hagen obtained a single example from the outer hills.

614. *LEPTOCIRCUS CURIUS*, Fabricius.

Grose Smith. Snellen. Hagen. Staudinger. Distant.

615. *LEPTOCIRCUS MEGES*, Zinken-Sommer.

Hagen. Staudinger as *virescens*. Both species of *Leptocircus* occur throughout the year in the plains and on the outer hills; they are fond of running water, and fly very low over open grassy places on river banks; they often settle on wet sand, but never on the grass. When flying they make constantly a strange vibrating motion with the hind-wings, which adds to their strong likeness to dragonflies. The females are rare.

Family *HESPERIIDÆ*.

In the family *Hesperiidæ* we have followed the order given in Captain E. Y. Watson's paper in the Journal of the Bombay Natural History Society, vol. ix, p. 411 (1895), entitled "A key to the Asiatic Genera of the *Hesperiidæ*," which considerably changes the sequence of the genera in Captain Watson's previous paper in the Proceedings of the Zoological Society of London, 1893, p. 3, "A proposed Classification of the *Hesperiidæ*, with a Revision of the Genera."

616. *ORTHOPHÆTUS PHANÆUS*, Hewitson.

Grose Smith as *phaneus* [sic]. Occurs rarely in forest near Selesseh and on the outer hills, only two male specimens obtained, one in April, the other in August.

617. *CHARMION FICULNEA*, Hewitson.

C. ficulnea, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 49, n. 1 (1894).

Grose Smith. On the outer hills and near Bekantschan throughout the year not very commonly.

618. **CELÆNORRHINUS LADANA*, Butler.

Astictopterus ladana, Elwes, Proc. Zool. Soc. Lond., 1892, p. 662, pl. xliii, fig. 4, male.

Grose Smith. I have never seen this species.

619. *CELÆNORRHINUS LEUCOCERA*, Kollar.

Throughout the year, but most plentifully in March, and fairly common from Bekantschan to the Central Plateau, never at lower elevations.

620. *CELÆNORRHINUS SIMULA*, Hewitson.

Pterygospidea simula, Hewitson, Ann. and Mag. of Nat. Hist., fourth series, vol. xx, p. 321 (1877).

Hewitson. Grose Smith. Originally described from Sumatra. Occurs at the same time, and in the same localities, as *C. leucocera*, Kollar, but is somewhat rarer.

621. *CELÆNORRHINUS ASMARA*, Butler.

Hagen as *acmara* [sic]. Very rare, only two specimens obtained from the mountains in October.

622. *CELÆNORRHINUS AURIVITTATA*, Moore.

Hagen. Common throughout the year from Selesseh to Bekantschan; very plentiful near Namoe Oekor. It is very quick flying, and always settles on the undersides of leaves near the ground.

623. *COLADENIA DAN*, Fabricius.

Snellen. Hagen. Staudinger. Common over the whole of our area, and flies throughout the year, often frequenting the same flowers as *Zemeros albipunctata*, Butler, and *Z. emesoides*, Felder, on which it settles in nearly the same manner, so that it is only when the insect is in the net that its identity can often be determined.

624. *DAIMIO DIRÆ*, de Nicéville.

D. diræ, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. , n. 37, pl. Q, fig. 49, male (1896).

Rare, five specimens only, from May to July near Selesseh and on the outer hills near Namoe Oekor.

625. *SATARUPA GOPALA*, Moore.

Only at higher elevations south of Bekantschan rarely throughout the year. It is an interesting fact that this butterfly, which has only hitherto been recorded from Sikhim, Assam, and Burma, should occur as far south as Sumatra.

626. SATARUPA AFFINIS, Druce.

The "*Tagiades*" *niphates*, Weymer, Stet. Ent. Zeit., vol. xlviii, p. 15, n. 13, pl. i, fig. 5, *male* (1887), from West Sumatra (Padang) is a synonym of this species. In Sumatra it occurs at the same elevations as *S. gopala*, Moore, but also lower down on the outer hills. It is a much commoner butterfly, and flies throughout the year.

627. *SATARUPA SAMBARA, Moore.

Hagen. This is probably an incorrect identification, the last-named species being intended. Herr G. Weymer notes (l. c.) that *Tagiades cosima*, Plötz, described from North India, is a synonym of this species.

628. ODINA HIEROGLYPHICA, Butler.

Excessively rare, only one specimen from Bekantschan in October, 1893.*

629. *TAGIADES JAPETUS, Cramer.

Snellen. Hagen. Originally described from Amboina. We have nothing from Sumatra agreeing exactly with Cramer's figure, which shews on the forewing the usual three subapical transparent white dots, two similar spots in the discoidal cell, and two on the disc divided by the second median nervule. It is very closely allied to the next species.

630. TAGIADES GANA, Moore.

Snellen. Hagen as *gana* [sic]. Not rare in the plains.

631. TAGIADES ATTICUS, Fabricius.

Occurs commonly over the whole of our area.

* I take this opportunity to describe a butterfly closely allied to *Odina hieroglyphica*.

ODINA ORTYGIA, de Nicéville, n. sp.

HABITAT: Daunat Range, Tenasserim, Burma.

EXPANSE: Male, 1.45 inches.

DESCRIPTION: MALE. Closely allied to "*Plastingia*" *hieroglyphica*, Butler, described from Sarawak (Borneo), differing therefrom on both surfaces in having all the black markings reduced by half, all the orange markings therefore greatly enlarged. It may be said (to judge from Mr. Butler's figure) that *O. hieroglyphica* is a black insect with yellow spots, while *O. ortygia* is a yellow insect with narrow black lines dividing the surface into irregular orange tessellations.

I hope to more fully describe and figure this very beautiful butterfly at a subsequent date. The type is unique in my collection.

632. TAGIADES TOBA, de Nicéville.

T. toba, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. , n. 32, pl. T, fig. 47, male (1896).

Occurs somewhat rarely in March, April and October in the mountains south of Namoe Oekor.

633. TAGIADES DEALBATA, Distant.

Found rarely in the mountains south of Namoe Oekor.

634. TAGIADES RAVI, Moore.

Hagen as *rani* [sic]. Butler. Not uncommon in the plains.

635. TAGIADES PRALAYA, Moore.

Not common in the mountains south of Namoe Oekor.

636. TAGIADES TRICHONEURA, Felder.

Grose Smith. Hagen. Occurs rarely in the same regions as the last-named species.

637. TAGIADES PINWILLI, Butler.

Originally described from Malacca. Excessively rare, a single specimen only obtained on the outer hills on 9th July, 1894. I have both sexes of this species from Toungoo in Central Burma. All the species of *Tagiades* are true inhabitants of high forest, and are very quick on the wing, but they never fly for long distances, and settle often with outspread wings, mostly on the underside of leaves. The species which have white markings on the wings when flying look wholly white.

638. TAPENA LAXMI, de Nicéville.

Originally described from Upper Tenasserim and Perak; occurs also at Singla, below Darjiling, in May. In Sumatra it is rare in the forests of the outer hills near Namoe Oekor. Dr. Martin possesses three pairs only, taken in February, May to August, and December.

639. TAPENA THWAITESI, Moore.

Originally described from Ceylon. Is not the "*Plesioneura*" *atilia*, Mabille, var. *palawana*, Staudinger, Iris, vol. ii, pp. 157, 165, pl. ii, fig. 11, male (1889), the same species as, or very closely allied to, *T. thwaitesi*? The description and figure are said to have been taken from a male specimen, but the markings are those of the female of *T. thwaitesi*. This species is very rare in Sumatra, only two specimens having been obtained in April in the forest near Selesseh.

Dr. Martin informs me by letter from Munich that he possesses three specimens of a third species of *Tapena* which may perhaps be *T. agni*, de Nicéville. As I have not seen these specimens I cannot include them in the list.

640. ODONTOPTILUM ANGULATA, Felder.

Hagen as *angulatus* [sic]. Staudinger. The *Achlyodes sura* of Moore, described from N.-E. Bengal, is a synonym.

641. ODONTOPTILUM PYGELA, Hewitson.

Both species of *Odontoptilum* are common, *O. angulata*, Felder, at lower, *O. pygela* at higher elevations, and occur throughout the year. They frequent wet spots on roads, settling with wide-spread wings. *O. angulata* is called by the Malay collectors "Koepoe Tai ayam, The fowl's excrement butterfly," which is a very good description of its appearance.

642. *ASTICTOPTERUS JAMA, Felder.

Grose Smith. Butler. Distant. I have never been able to identify this species which was originally described from a male from the Malay Peninsula.

643. ASTICTOPTERUS OLIVASCENS, Moore.

Isoteinon melania, Plötz, Berl. Ent. Zeitsch., vol. xxix, p. 230, n. 26 (1885); *Astictopterus melania*, id., Stet. Ent. Zeit., vol. xlvii, p. 110, n. 4 (1886).

Hagen as *olivescens* [sic], and *Isoteinia* [sic] *melania*. Herr G. Weymer has sent me a coloured drawing of the type of "*Isoteinon*" *melania* in the collection of Herr Karl Ribbe. It appears to be the same species as *Astictopterus olivascens*, Moore, which latter species is not mentioned by Plötz in any of his papers, and appears therefore to have been unknown to him. *I. melania* was described from Malacca. In Sumatra *A. olivascens* is very common and ubiquitous throughout the year, and with *Padraona dara*, Kollar, is the commonest of our *Hesperiidæ*. The males are very fond of the flowers of a wild Geranium-like plant and are found on every roadside and hedge. The dark uniformly coloured butterfly has a pretty appearance when contrasted with the tiny red cup of the flower on which it is resting.

644. SANCUS PULLIGO, Mabille.

Grose Smith as *fuscula*. Hagen as *fuscula*. According to Captain Watson, "*Tagiades*" *fuscula*, Snellen (= "*Astictopterus*" *celunda*, Staudinger), is, as far as is known, confined to Celebes, while *S. pulligo*,

Mabille (= *subfasciatus*, Moore, and *ulunda*, Plötz), occurs in South India, Burma, the Malay Peninsula, Java, Borneo, the Sulu Isles, and the Philippine Isles. In Sumatra it is common on the outer hills and plentiful near Namoe Oekor throughout the year.

645. KORUTHAIALOS XANITES, Butler.

Grose Smith. I sent a long suite of specimens of this genus allied to *K. xanites* to Captain Watson, who pronounces that amongst them are several undescribed species from Sumatra, to be discriminated by the length of the palpi and the greater or less prominence of the orange markings on both sides of the forewing. As this latter feature is apparently extremely variable I hesitate to describe any of these supposed new species, as before doing so I think that critical examination of the prehensores of the males of all the species of the genus should be made.

646. KORUTHAIALOS VERONES, Hewitson.

Astictopterus verones, Hewitson, Ann. and Mag. of Nat. Hist., fifth series, vol. i, p. 341 (1878).

Hewitson. Grose Smith. Originally described from Sumatra thus:—"Both sides rufous-brown. Underside of the anterior wing marked by a subapical rufous spot." This is one of the well-marked forms of the genus, which I possess also from Java. It occurs in Sumatra not uncommonly with *K. xanites*, Butler.

647. KORUTHAIALOS KERALA, de Nicéville.

K. kerala, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. , n. 33, pl. T, fig. 48, male (1896).

Somewhat rare, occurs in the mountains in May.

648. KORUTHAIALOS KOPHENE, de Nicéville.

K. kophene, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. , n. 34, pl. T, figs. 49, male ; 50, female (1896).

A rarer species than the one last-named, we possess three or four specimens only from Sumatra. All the species of the genus are inhabitants of the forest, where they are chiefly found on grassy forest paths and on low flowers. They occur more abundantly at higher elevations south of Namoe Oekor.

649. SUADA SWERGA, de Nicéville.

S. swerga, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 372, n. 1 (1895).

This species has a wide range, occurring in Sikhim, Burma, the

Malay Peninsula and Java, as well as at Bekantschan in N.-E. Sumatra in November, rarely.

650. *SUASTUS GREMIUS, Fabricius.

Staudinger. A very common "Skipper" in India, Ceylon, and Burma, but we have not met with it in Sumatra.

651. SUASTUS TRIPURA, de Nicéville.

Tagiades tripura, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. vi, p. 392, n. 36, pl. G, fig. 39, *female* (1891).

Originally described from Perak; occurs also at Selesseh and in the outer hills of Langkat rarely in March and December, and in Java and Pulo Laut.

652. SUASTUS PHIDITIA, Hewitson.

Hewitson. Grose Smith. Kirby. Originally described from Sumatra, where it occurs rarely at Namoe Oekor.

653. IAMBRIX STELLIFER, Butler.

Grose Smith as *salsala*. Captain E. Y. Watson notes that "*I. stellifer* is quite distinct from *I. salsala*, Moore, with which it has been said to be synonymous. It is smaller and darker, and is entirely without the golden yellow scales on the upperside which are characteristic of *I. salsala*." It is a common species in the forests of the outer hills throughout the year. It has a very quick flight, and keeps close to the ground; being so small it is not easy to see when on the wing.

654. IAMBRIX SINDU, Felder.

Hagen. Grose Smith. Found in the same localities and at the same seasons as the last-named butterfly, but is rarer and not so quick on the wing.

655. GE GETA, de Nicéville.

G. geta, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 374, n. 39, pl. Q, fig. 51, *male* (1895).

Described from Penang in the Malay Peninsula, and from N.-E. Sumatra, where it is very rare, a few males only having been obtained from Selesseh and the outer hills in July.

656. AMPITTIA MARO, Fabricius.

Thymelicus palemonides, Snellen, Midden-Sumatra, Lep., p. 28, n. 1 (1892).

Snellen as *palemonides*. Rare and very local in our area, found at Stabat and near Bandar Quala in Serdang.

657. *AEROMACHUS INDISTINCTA*, Moore.

Occurs at high elevations from Bekantschan to the Central Plateau from May to August.

658. *LOPHOIDES IAPIS*, de Nicéville.

Isoteinon iapis, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. v, p. 213, n. 15, pl. E, fig. 9, *male* (1890).

Originally described from Burma and the Malay Peninsula, occurs also in Java and Pulo Laut. In Sumatra it is found somewhat rarely from Selesseh to Bekantschan from July to October.

659. *HYAROTIS ADRASTUS*, Cramer.

Hagen as *phænicis*. Very rare in Sumatra though so common in India, but occurs throughout the year at Paya Bakong and near Bindjei. In September, 1894, Dr. Martin noticed a plant of *Calamus* (rattan cane) in front of his house at Bindjei, the leaves of which were much eaten, and attached to the leaves were several empty and one full pupa of this species. The latter was affixed to a leaf closed with a web, and looked more like a living satyrine larva about to turn to a pupa than a real pupa of a hesperid. It was affixed quite flatly to the leaf, and was capable of considerable motion.

660. *ITYS IADERA*, de Nicéville.

I. iadera, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 379, n. 41, pl. Q, fig. 52, *male* (1895).

Described from Penang and the Battak mountains of N.-E. Sumatra, where it occurs throughout the year at high elevations south of Bekantschan.

661. *ZOGRAPHETUS OGYGIA*, Hewitson.

Hewitson. Grose Smith. Kirby. Originally described from Sumatra. Occurs throughout the year at Selesseh and Namoe Oekor in the forest, and has a very rapid flight. Fresh specimens have a beautiful bluish gloss on the upperside of both wings.

662. *ISMA FERALIA*, Hewitson.

Originally described from Java. Rare in the outer hills of Sumatra in September.

663. *ISMA BONONIA*, Hewitson.

In the outer hills in September, very rare.

664. ISMA INARIME, de Nicéville.

I. inarime, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. vi, p. 391, n. 35, pl. G, fig. 38, *male* (1891).

Originally described from Perak, found also in Pulo Laut. In Sumatra it occurs in the forest near Selesseh throughout the year, but is rare.

665. ISMA CORISSA, Hewitson.

Isoteinon indrasana, Elwes and de Nicéville, Journ. A. S. B., vol. lv, pt. 2, p. 441, n. 166, pl. xx, fig. 5, *female* (1887).

Originally described from Borneo, occurs also in Lower Burma and Tavoy. In Sumatra it is found in the mountains south of Namoe Oekor and Bekantschan in February, July, August, October, and December.

666. ISMA SUBMACULATA, Staudinger.

Plastingia submaculata, Staudinger, Iris, vol. ii, p. 149, pl. ii, fig. 8, *male* (1889).

Originally described from Palawan in the Philippine Isles. We possess specimens from Selesseh taken in October.

667. MATAPA ARIA, Moore.

Grose Smith. Hagen as *avia* [sic]. Occurs throughout the year in the plains somewhat plentifully. At Bindjei it entered Dr. Martin's house several times at 7 o'clock in the evening attracted by the just lighted lamps in the verandah.

668. MATAPA DRUNA, Moore.

From Bindjei to the outer hills in February and July; rarer than the last-named species.

669. MATAPA SASIVARNA, Moore.

Occurs in the plains and also at higher elevations, found at Bekantschan in July, August and December.

670. SEPA CRONUS, de Nicéville.

S. cronus, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 50, n. 42, pl. v, fig. 4, *male* (1894).

The type, which is still unique, was taken in the Battak mountains on 10th September, 1893.

671. ACERBAS ANTHERA, Hewitson.

A. anthera, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 382, n. 1 (1895).

Originally described from Singapore; occurs also in Tenasserim,

Malacca, Java, and Borneo. In Sumatra a unique example was taken in the Battak mountains in August, 1894.

672. *ZEA MYTHECA*, Hewitson.

Originally described from Malacca. Dr. Martin obtained a single male example in the Battak mountains of N.-E. Sumatra in March, 1894.

673. *ERIONOTA THRAX*, Linnæus.

Snellen. Hagen. Distant. Very common everywhere throughout the year in ever following generations wherever species of wild or cultivated *Musa* ("Pisangs" in Malay, or Plantains) grow, on the leaves of which the larva feeds. The larva is white, covered with a white waxy powder, and has a black heart-shaped head. It lives in a shelter made of a portion of a rolled-up leaf. To make this shelter, it has to cut into the edge of one of the enormous leaves to obtain a suitable segment to be rolled up. The pupa is whitish, covered with the same white powder as is the larva, and is hidden from view in its dining room. This powder is of the greatest service to the animal, as in consequence of the heavy showers of rain of the tropics much water often collects in the rolled-up leaf, and the pupa if not so protected would soon be drowned and rot, as it is the powder keeps the pupa dry until the water has drained away or dried up. The butterfly emerges from the pupa in the early hours of the afternoon at 2 or 3 P.M., and is on the wing before sunrise and after sunset, and comes to the lights in the verandahs of houses. Even at the earliest dawn, between 4 and 5 A.M., Dr. Martin has noticed them flying round the plantain groves near his house. *E. thrax* often appears in large numbers, and then the caterpillars assist the south wind in giving the plantain leaves their usual torn and picturesque appearance; but as the leaves are but little used except by the Madrasi Tamils, who utilize small perfect portions as plates when eating, the larvæ cause no loss to anyone.

674. *ERIONOTA ATTINA*, Hewitson.

Semper. Originally described from a female from "India" and Java. Its male is the *Unkana batara* of Distant. It is rare at low elevations throughout the year, at Bindjei and in the plains generally.

675. *ERIONOTA SANGUINOCULUS*, Martin.

E. sanguinoculus, Martin, Einige neue Tagschmetterlinge von Nordost-Sumatra, (Munich), pt. 1, p. 5, n. 3 (1895).

Described from a unique male example taken in the forest near Selesseh in May. In Dr. Hagen's collection is a second male specimen.

676. GANGARA THYRSIS, Fabricius.

Hagen. Grose Smith. Semper. The giant of the *Hesperiidæ* of our area, and much rarer than *E. thrax*, Linnæus, but occurs throughout the year in places where *Calamus* grows, on which the white waxy-powdered downy larva feeds. The pupa is hidden in three rolled-up leaves, and is fixed by the extremity of the abdomen to a woven tripod in such a way that it can move in all directions. As soon as its shelter is touched it makes such a loud rattling noise that anyone would be at least startled or frightened on first hearing it. Like *E. thrax*, the butterfly emerges from the pupa late in the afternoon (from 3 to 5 o'clock P.M.), and flies after sunset.

677. PADUKA LEBADEA, Hewitson.

Originally described from Borneo, but found in Ceylon (*subfasciata*, Moore), the Malay Peninsula (*glandulosa*, Distant), the Andaman Isles (var. *andamanica*, Wood-Mason and de Nicéville), N.-E. Sumatra, and Java. It is very rare in our area, in all the time Dr. Martin was in Sumatra he only obtained three specimens near the village of Selesseh in March and April.

678. KERANA ARMATUS, Druce.

Found only at higher elevations, from Bekantschan to the Central Plateau, where it is fairly common and occurs throughout the year.

679. KERANA GEMMIFER, Butler.

Butler. Occurs from Selesseh to Bekantschan rather rarely throughout the year.

680. KERANA DIOCLES, Moore.

Tagiades maura, Snellen, Midden-Sumatra, Lep., p. 28, n. 1 (1892).

Hagen as *maurus* [sic]. Grose Smith as *diocles*. Found commonly throughout the year from Selesseh to the Central Plateau. Flies near villages and houses, on roadsides and open places, never in the large forests.

681. KERANA FULGUR, de Nicéville.

K. fulgur, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 55, n. 46, pl. i, fig. 6, female (1894); idem, id., Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 383, n. 42, pl. Q, fig. 54, male (1895).

Occurs in Selesseh and in the outer hills rarely throughout the year. Dr. Martin and I obtained four pairs only.

682. *PIRDANA HYELA*, Hewitson.

Hagen. Originally described from Java, from whence I possess both sexes. Found also at Sungei Ujong in the Malay Peninsula. In this species the underside of both wings is striped with green along the veins, in *P. pavona*, de Nicéville, the underside is not thus marked. We possess only four specimens taken in Bekantschan in July and August.

683. *PIRDANA PAVONA*, de Nicéville, n. sp.

HABITAT: Perak in the Malay Peninsula; N.-E. Sumatra; Java.

EXPANSE: ♂, 1.85 to 2.25; ♀, 1.90 to 2.30 inches.

DESCRIPTION: MALE. UPPERSIDE, *both wings* glossy hair-brown. *Forewing* unmarked, the *cilia* brown. *Hindwing* unmarked, the *cilia* yellow, narrow anteriorly, wide posteriorly, and the yellow colour extending on to the wing membrane broadly at the anal angle. UNDERSIDE, *both wings* very dark verditer green. *Forewing* with the inner margin broadly as far as the median nervure and second median nervule dark ochreous, merging anteriorly into dark brown; the *cilia* pale brown. *Hindwing* unmarked, except that the anal angle is somewhat broadly brown anterior to the broad outer yellow area, which latter, together with the *cilia*, are as on the upperside. *Body* above dark brown. *Palpi* and *body* beneath with a small anal tuft yellow. FEMALE. UPPERSIDE, *both wings* glossy hair-brown. *Forewing* with the basal half glossed with deep shining steel bluish-green. *Hindwing* with the basal two-thirds glossed with the same colour; the yellow colour at the anal angle twice as broad as in the male. UNDERSIDE, *both wings* with the green ground-colour of a much paler shade than in the male. *Hindwing* with no brown area at the anal angle, the angle itself even more broadly yellow than on the upperside.

Allied to *Hesperia ismene*, Felder, from Celebes; *Hesperia hyela*, Hewitson, from the Malay Peninsula, Java and Sumatra; and *Pirdana rudolphii*, Elwes and de Nicéville, from Sikhim, the Khasi Hills and Tavoy in Lower Burma, but differing therefrom in the ground-colour of the underside being uniformly green, instead of dark brown with the green colour arranged in stripes along the veins.

Described from one male from Perak, a single male from the Battak mountains of N.-E. Sumatra taken in January, and a male and two females (the types) from Java, received without precise locality from Herr H. Fruhstorfer.

684. *PLASTINGIA CALLINEURA*, Felder.

Originally described from Java. *Hesperia latoia*, Hewitson, described from Singapore, is a synonym, as is also I believe *P. margherita*,

Doherty, from Margherita and Sadiya in Upper Assam, and *P. fruhstorferi*, Snellen, from Java. *P. callineura* appears to be a very variable species not only in colouring but also in size, as our specimens measure in expanse of wings from 1.15 to 1.75 inches. In Sumatra it is common in the forests of the outer hills south of Namoe Oekor throughout the year. It settles with folded wings. It requires a skilled eye to distinguish it when at rest from common species of *Padraona* or *Telicota*.

685. *PLASTINGIA HELENA*, Butler.

Hagen. Is much rarer than the last-named species, but occurs throughout the year from Selesseh to Bekantschan.

686. *PLASTINGIA VERMICULATA*, Hewitson.

P. vermiculata, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 56, n. 47, pl. v, fig. 15, male (1894).

Hewitson. Grose Smith. Originally described from Sumatra; occurs in the Battak mountains near Bekantschan in July rarely, only two or three specimens obtained.

687. *PLASTINGIA TESSELLATA*, Hewitson.

Originally described from Macassar in Celebes. The markings of the underside are stated to be "yellow." The "*Hesperia*" *eulepis* of Felder, described also from Celebes, is said to have the markings on the underside "ochraceo-sulphureis," and is almost certainly a synonym. The next-named species is given by Captain Watson as a synonym also, but it has the markings of the underside "pure silvery white." I believe it to be distinct. *P. tessellata* is very rare, two or three specimens only have been taken near Bekantschan in July.

688. *PLASTINGIA NAGA*, de Nicéville.

Hesperia? *naga*, de Nicéville, Journ. A. S. B., vol. lii, pt. 2, p. 89, n. 37, pl. x, fig. 2, female (1883).

Occurs at Sibsagar in Upper Assam, Singapore, N.-E. Sumatra, and Java. Not less rare than the two foregoing species, four or five specimens only obtained in March, June and December. Dr. Martin caught it himself commonly in Singapore in February, 1895.

689. *LOTONGUS CALATHUS*, Hewitson.

Hewitson. Hagen. Grose Smith. Distant. Snellen. Kirby. Originally described from Sumatra. I possess specimens from the

Daunat Range in Middle Tenasserim, Burma, and from Java. It is very rare in our area, a few specimens only have been obtained in March and May on the outer hills. It is probable that the "*Hesperia*" *traviata* of Plötz (see No. 756) is a synonym of this species. "*Eudamus*" *calathus* is nowhere mentioned by Plötz, and appears to have been unknown to him.

690. *LOTONGUS SCHÆDIA*, Hewitson.

L. maculatus, Distant, Rhop. Malay., p. 372, n. 2, pl. xxxv, fig. 1, *male* (1886).

Hewitson. Grose Smith as *schædia* [sic]. Kirby. Originally described from Sumatra. Distant described it from Malacca. I possess specimens from Perak in the Malay Peninsula. The *Lotongus parthenope*, Weymer (de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. vii, p. 354, n. 22, pl. J, figs. 4, *male*; 5, *female* (1892), is quite distinct from this species, still more so from *L. calathus*, Hewitson. *L. schædia* is commoner in Sumatra than *L. calathus*, but is always somewhat scarce, and occurs throughout the year from Selesseh to Namoe Oekor and on the outer hills. Dr. Martin caught it fairly commonly in February, 1895, on the small Dutch island of Riouw near Singapore.

691. **LOTONGUS AVESTA*, Hewitson.

L. avesta, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 383, n. 43, pl. Q, fig. 56, *female* (1895).

Hewitson. Grose Smith. Kirby. Originally described from Sumatra. Mr. H. J. Elwes has specimens from Pulo Laut near Borneo, and I have a single female example from the Ataran Valley, Tenasserim, Burma.

692. *LOTONGUS EXCELLENS*, Staudinger.

Proteides excellens, Staudinger, Iris, vol. ii, p. 141, pl. ii, fig. 6, *male* (1889).

Originally described from Palawan in the Philippine Isles. Superficially it reminds one instantly of *Hasora* (*Parata*) *chuza*, Hewitson. It is very rare at high elevations south of Bekantschan, only four specimens were obtained in March and August of the last year of Dr. Martin's residence in Sumatra.

693. *ZELA ZEUS*, de Nicéville.

Z. zeus, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 388, n. 44, pl. Q, fig. 57, *male* (1895).

Occurs rarely at Selesseh and in the Battak mountains in May. The type is from Pulo Laut near Borneo.

694. *HIDARI IRAVA*, Moore.

Hagen. Grose Smith. Staudinger. Snellen. Very common and occurs throughout the year in ever following generations everywhere where the cocoa-nut palm grows, on the leaves of which the larva feeds together with *Amathusia phidippus*, Johanssen (*vide ante*, p. 393). The female always lays her eggs on young leaves, and the larvæ are sometimes so abundant as to do appreciable damage to the palms by devouring all the leaves. The larva is of a dirty green colour with subdorsal black stripes and an ochreous head, and is hidden from view between two leaves of the food-plant woven together. The pupa is reddish-brown. The butterflies are on the wing early in the morning and after sunset, and often come to the lighted lamps. In the daytime they rest with folded wings in dark places near houses. Once in 1892 all the cocoa-nut trees near the Manager's house at Namoe Oekor were eaten up by the larvæ, and later hundreds of the butterflies took shelter during the day in the house. None of them rested on the white-washed walls, but all on the dark curtains and portières.

695. *HIDARI DOESOENA*, Martin.

H. doesoena, Martin, Einige neue Tagschmetterlinge von Nordost-Sumatra, pt. 1, (Munich), p. 6, n. 4 (1895).

The name given to this species by Dr. Martin is Dutch, and is pronounced *dusuna* not *desena*. It has been described from six males only taken in August near Bekantschan.

696. **HIDARI HARMACHIS*, Hewitson.

Astictopterus harmachis, Hewitson, Ann. and Mag. of Nat. Hist., fifth series, vol. i, p. 341 (1878).

Hidari staudingeri, Distant, Rhop. Malay., p. 395, n. 3, pl. xxxv, fig. 25 (1886).

Hewitson. Grose Smith. Hewitson described this species from a specimen in his collection from Sumatra, and referred to another in Dr. Staudinger's collection from Malacca. Mr. Distant described it as a "new species" from a Malaccan specimen, also in Dr. Staudinger's collection, probably the one Hewitson referred to. Distant also referred to *Astictopterus*? *harmachis*, but failed to recognise it (l. c., p. 404). We have not seen this species.

697. *EETION ELIA*, Hewitson.

E. elia, de Nicéville, Journ. Bomb. Nat. Hist. Soc. vol. ix, p. 396, n. 1 (1895).

Hewitson. Grose Smith. Butler. Kirby. Distant. Originally described from Sumatra, where it occurs in our area at Selesseh and on the outer hills from May to August.

698. *ETION MARTINI*, Distant.

Zea martini, Distant, Ann. and Mag. of Nat. Hist., fifth series, vol. xix, p. 274, n. 187 (1887).

Originally described from Northern Borneo. In our area it occurs rarely at Selesseh, Namoe Oekor, and on the outer hills in April, July, August, October and November. It has a rapid flight, and when flying appears to be entirely white.

699. *PITHAURIA (Pithauriopsis) AITCHISONI*, Wood-Mason and de Nicéville.

Pithauriopsis aitchinsoni, Wood-Mason and de Nicéville, Journ. A. S. B., vol. lv, pt. 2, p. 387, n. 233, pl. xv, fig. 4, male (1886).

Originally described from Cachar; it is common in the forests of Middle Tenasserim, Burma, where I have taken it sucking up moisture on the banks of streams in October. It is found also in Java and N.-E. Sumatra, where it flies throughout the year somewhat scarcely on the outer hills.

700. *NOTOCRYPTA FEISTHAMELII*, Boisduval.

Snellen. Staudinger as *alysos*. Captain Watson gives the "*Plesioneura*" *alysos* of Moore as a synonym of this species. Common all over our area throughout the year in shady grassy places in or near forest.

701. *NOTOCRYPTA RESTRICTA*, Moore.

Found always with the last-named species, but is somewhat rarer.

702. *NOTOCRYPTA MONTEITHI*, Wood-Mason and de Nicéville.

Plesioneura monteithi, Wood-Mason and de Nicéville, Journ. A. S. B., vol. lv, pt. 2, p. 391, n. 245, pl. xviii, figs. 3, 3a, female (1886).

Originally described from Cachar. It is exceedingly rare, I possess a single female example from Sumatra.

703. **NOTOCRYPTA ALBIFASCIA*, Moore.

Hagen as *albofascia* [sic]. Originally described from Hatsiega, Tenasserim, Burma. It is probable that Dr. Hagen identified the last-named species under this name, as the two are very closely allied.

704. *NOTOCRYPTA NEÆRA*, de Nicéville.

N. neæra, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. vi, p. 379, n. 25, pl. G, fig. 27, female (1891).

Originally described from Perak in the Malay Peninsula, occurs

also in Tenasserim, Burma. It is very rare in our area, only two specimens having been obtained from the higher mountains in March.

705. UDASPES FOLUS, Cramer.

Hagen as *folus*, Fabricius [sic]. Grose Smith. Common and ubiquitous throughout the year in gardens and on grassy places and roadsides; never in forest.

706. GEHENNA GRÆÆ, de Nicéville.

G. grææ, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 399, n. 47, pl. Q, fig. 59, *male* (1895).

Described from a unique male taken on 23rd January, 1893, at Namoe Oekor.

707. CUPITHA PURREEA, Moore.

Very rare in the forest near Selesseh, only four specimens obtained in May.

708. TELICOTA AUGIAS, Linnæus.

T. augias, Wood-Mason and de Nicéville, Journ. A. S. B., vol. lv, pt. 2, p. 384, n. 224, pl. xvii, fig. 1, *male* (1886).

Snellen. Hagen. Distant.

709. TELICOTA BAMBUSÆ, Moore.

Hagen. Both the species of *Telicota* are common in the plains throughout the year, and are very fond of flowers.

710. PADRAONA DARA, Kollar.

Grose Smith as *mæsa* [sic]. There is little doubt I think that "*Pamphila*" *mæsa*, Moore, is a synonym of "*Hesperia*" *dara*, Kollar. It is more than probable that several species are included under this name. Nearly everywhere where the genus is found, individuals are very numerous, and these to a certain extent can be superficially sorted into apparently distinct species by size and colour, but until the prehensores of the males of a large number of specimens from various localities have been carefully, critically and exhaustively studied, there does not appear to be much hope of correct specific diagnosis. *P. dara* is the commonest and most ubiquitous of the *Hesperiidæ* in our area, and flies all the year round.

711. *PADRAONA MÆSOIDES, Butler.

Hagen. Originally described from Malacca. I have never been able to recognise it with any degree of certainty.

712. *PADRAONA SUNIAS, Felder.

Snellen. Hagen. Originally described from Amboina, but has never been figured.

713. PADRAONA PAVOR, de Nicéville.

P. pavor, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 53, n. 44, pl. iv, fig. 8, male (1894).

Found only at high elevations throughout the year on the Central Plateau, not below 3,000 feet elevation, where it is as common as *P. dara*, Kollar, is in the plains.

714. PADRAONA GOLLA, Moore.

Much rarer than *P. dara*, Kollar, but occurs all over our area and throughout the year in the plains.

715. PADRAONA PARAGOLLA, de Nicéville, n. sp.

HABITAT: N.-E. Sumatra.

EXPANSE: ♂, ♀, 1.1 inches.

DESCRIPTION: MALE. UPPERSIDE, *both wings* fuscous, with rich ochreous markings. *Forewing* with the base (especially towards the costa) irrorated with golden-coloured scales; a broad oblique discal band from the inner margin near the base of the wing almost to the costa towards the apex of the wing, crossed by the black veins, on the side facing the costa anteriorly with a very irregular, posteriorly with an even edge, the side facing the outer margin with an even edge; anteriorly at the end of the discoidal cell indented with a tooth of the fuscous ground-colour; the band is narrow at both ends, broad in the middle. *Hindwing* with a large oval patch occupying the middle of the wing not reaching the costa or the abdominal margin; the base thickly clothed with long golden-coloured setæ. UNDERSIDE, *forewing* black, irrorated throughout, except the basal portion broadly of the inner margin, with golden-coloured scales; the discal band as on the upperside; a somewhat narrow marginal golden-coloured band, broadest at the costa, narrowing posteriorly, not quite reaching the inner angle of the wing; an anteciliary fine black line. *Hindwing* black, heavily irrorated throughout with golden-coloured scales; the discal oval patch as on the upperside, but bearing anteriorly at the end of the discoidal cell a small black spot; a narrow marginal golden-coloured line, and an anteciliary fine black line. *Cilia* throughout golden-coloured, broad on the hindwing, somewhat infuscated anteriorly in the forewing. *Head* and *body* black, but thickly clothed with ochreous setæ. *Antennæ* anteriorly black, posteriorly annulated with yellow, the thick portion of the club beneath

entirely yellow. FEMALE. UPPERSIDE, *both wings* with the ground-colour and markings duller, the latter narrower, than in the male. *Forewing* with no golden-coloured irrorations at the base of the wing. UNDER-SIDE, *both wings* duller coloured throughout than in the male, the discal patch on the hindwing distinctly whitish.

Nearest to "*Pamphila*" *gola*, Moore, described and figured from Port Blair in the South Andaman Isles. A synonym of this species is *Padraona goloides*, Moore, described and figured from Ceylon. I have carefully compared specimens of these two species from the above-named islands, and find that the differences relied on by Mr. Moore to separate them are absolutely inconstant. The following are recorded localities for *P. gola*:—Port Blair, South Andamans; Mergui; Thaing, King Island (Mergui Archipelago) (*Moore*); Silcuri (Cachar) (*Wood-Mason* and *de Nicéville*); Sumba; Sambawa (*Doherty*); Buxa (Bhutan) (*Elwes*); Kiukiang (Central China) (*Leech*); Sikhim (*de Nicéville*); Nilgiri District (*Hampson*); and I possess specimens from the following hitherto unrecorded localities;—Calcutta; Orissa; Travancore; Perak (Malay Peninsula); N.-E. Sumatra; Nias; Java; S.-E. Borneo; and Celebes. *P. goloides* has been recorded from Ceylon by Moore, and from Singapore and Java by Distant. "*Pamphila*" *naranata*, Moore, is a MS. name for *P. goloides* in Horsfield and Moore's Cat. Lep. Mus. E. I. C., vol. i, p. 251, n. 565 (1857), and was recorded from Java. I have been informed by Mr. G. F. Hampson that *Pamphila augustula*, Herrich-Schäffer, from Cape York (Northern Australia) and the Fiji Islands is another synonym. Dr. Staudinger also records a "*Pamphila*" *goloides*, Moore, var. *akar*, Mabille, from Palawan (*Iris*, vol. ii, p. 146 (1889), which may be another synonym. *P. paragola* differs from *P. gola* on the upperside of the hindwing in having the discal patch broader in the middle thereby causing it to be oval instead of lengthened or band-like in shape; this feature is especially marked on the underside. The golden irroration of the underside almost throughout is peculiar to *P. paragola*. There are other smaller differences which are very obvious when specimens of the two species are compared side by side, but are difficult to express in words. I hope to figure *P. paragola* shortly.

Described from two males and one female in my collection.

716. PADRAONA PALMARUM, Moore.

Very rare, but every year Dr. Martin caught a few specimens round his house at Bindjei in the plains in July.

717. HALPE HOMOLEA, Hewitson.

Originally described from Singapore. Occurs in Sumatra somewhat rarely on the outer hills from May to August.

718. HALPE ZEMA, Hewitson.

Grose Smith. The "*Hesperia*" *ormenes*, Weymer, Stet. Ent. Zeit., vol. xlviii, p. 16, n. 14, pl. ii, fig. 6, *male* (1887), from Nias, is a synonym of this species. Also rare, occurs from Selesseh to Bekantschan in March, July and November.

719. HALPE INSIGNIS, Distant.

Originally described from Singapore. It is a true *Halpe*, Mr. Distant placed it in the genus *Baoris* with a query. Excessively rare, Dr. Martin took a single male in August near Tandjong Djatti.

720. HALPE HIERON, de Nicéville.

H. hieron, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 54, n. 45, pl. iv, fig. 1, *male* (1894).

Hitherto only recorded from N.-E. Sumatra, where it occurs only at high elevations not below 3,000 feet to the south of Bekantschan. In suitable localities it is not rare, we have specimens taken in February, April and August.

721. *HALPE BETURIA, Hewitson.

Snellen. Captain Watson states that *H. beturia* is confined to Celebes, and he described the Indian, Burmese, and Andamanese form as *H. moorei*. It is probable that the Sumatran species should be known by the latter name. We did not obtain it.

722. *HALPE MARSENA, Hewitson.

Hewitson. Grose Smith. Kirby. Originally described from Sumatra. It is very close to, if not identical with, "*Hesperia*" *ornata*, Felder, described from Java, but occurring also in Cachar, *vide* Wood-Mason and de Nicéville, Journ. A. S. B., vol. lv, pt. ii, p. 382, n. 214, pl. xviii, figs. 7, 7a, *male* (1886). Hewitson's name has priority by one year.

723. ITON SEMAMORA, Moore.

I. semamora, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 401, n. i (1895).

Hesperia barea, Hewitson, Trans. Ent. Soc. Lond., third series, vol. ii, p. 490, n. 12 (1866).

Hewitson. Kirby. Hewitson described this species from Sumatra under the name of "*Hesperia*" *barea*. It occurs from Namoe Ockor to Bekantschan and in the Battak mountains in March, July and August.

724. *BAORIS OCEIA*, Hewitson.

Very rare, only a few male specimens taken near Bekantschan in March.

725. *BAORIS (Chapra) MATHIAS*, Fabricius.

Snellen as *julianus*, Fabricius [sic], and *julianus*, Latrielle. Hagen as *mathias* and *julianus*. Butler as *julianus*. The "*Hesperia*" *julianus* of Latreille was described from Java, and appears to be a synonym of "*Hesperia*" *mathias*, Fabricius. This widely-distributed butterfly is very common throughout the year in the plains of Sumatra, especially so near Mabar.

726. *BAORIS (Chapra) BRUNNEA*, Snellen.

Chapra cære, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. vi, p. 388, n. 31, pl. G, fig. 33, male (1891).

When describing this species from Burma, I overlooked Heer P. C. T. Snellen's description and figure of the species from Java. In Sumatra it is rare from Bindjei to Bekantschan in March, and again in October and November.

727. *BAORIS (Parnara) CONJUNCTA*, Herrich-Schäffer.

Hagen. This is the "*Hesperia*" *narooa* of Moore, the "*Gegenes*" *javana* of Mabille, and the "*Hesperia*" *alice* of Plötz, the latter described from Mergui and the Philippines, of which Herr Gustav Weymer has been so good as to send me a beautiful coloured drawing of the type, which is a male, now in the Berlin Museum. It occurs commonly over the whole of our area and throughout the year.

728. *BAORIS (Parnara) TOONA*, Moore.

I am unable to follow Mr. J. H. Leech in placing this species as a synonym of "*Pamphila*" *pellucida*, Murray, specimens of the latter species in my collection from Japan, from whence it was described, appear to me to be quite distinct from "*Hesperia*" *toona*. The upper-side of both wings in fresh specimens of *B. toona* is rich ochreous, which it never is in *B. guttatus*, Bremer and Grey = "*Pamphila*" *mangala* Moore. *B. toona* has been figured and described by Mr. Distant in Rhop. Malay., p. 380, n. 3, pl. xxxiv, fig. 9 (1886) as *Baoris chaya*, Moore, a species which belongs to the *Chapra* section of the genus. Hitherto unrecorded localities for the species are Trevandrum in South India, Java, and Celebes. In N.-E. Sumatra it is as ubiquitous as the last-named species.

729. BAORIS (*Parnara*) CAHIRA, Moore.

Originally described from the South Andaman Isles. It has two spots in the discoidal cell and four on the disc of the forewing. I have specimens from Sumatra which agree with Mr. Moore's figure and description of the species. I have specimens also from Sumatra which agree with Mr. Moore's description and Mr. Elwes' woodcut of *Baoris austeni*, described from Assam, which also has two spots in the discoidal cell and five on the disc of the forewing. Again, I have other specimens from Sumatra agreeing with Mr. Moore's description of "*Hesperia*" *moolata*, described from Upper Tenasserim in Burma, which has one spot in the discoidal cell and also five on the disc of the forewing. Lastly, I have specimens from Sumatra agreeing with Mr. Moore's figure and description of "*Hesperia*" *kumara*, originally described from Canara in South India, recorded also from Mergui in Lower Burma and Ceylon by the author. It has no spots in the discoidal cell, but there are seven discal spots on the forewing. As all my Sumatran specimens appear to me to represent one and the same species, I record them under the oldest of Mr. Moore's four names. It may, however, be subsequently found on an examination of the prehensores of the male that some of these species may be valid. In Sumatra *B. cahira* is found at Bindjei and Namoe Oekor in the plains, but is much rarer than the two foregoing species, but flies throughout the year.

730. BAORIS (*Parnara*) BADA, Moore.

Pamphila apostata, Snellen, Midden-Sumatra, Lep., p. 27, n. 1 (1892).

"*Hesperia*" *bada*, Moore, was originally described from Ceylon and Malacca, and is figured in "The Lepidoptera of Ceylon" by the author. It has typically no spots in the discoidal cell of the forewing. Mr. Elwes says that "*Pamphila*" [sic] *mangala*, Moore, and "*Hesperia*" *bada*, Moore, as well as "*Pamphila*" [sic] *fortunei*, Felder, originally described from Shanghai in China, are synonyms of "*Eudamus*" *guttatus*, Bremer and Grey, originally described from North China. In this I do not entirely agree with him, as I consider *H. bada* and *H. fortunei* to be distinct. Mr. Leech gives *H. fortunei* as a synonym of *E. guttatus*, and omits *P. mangala* and *H. bada*. I agree with him in so far as to consider *P. mangala* to be synonymous with *E. guttatus*; the latter is, however, larger than (1.5 inches as against ♂, 1.2; ♀, 1.3 inches), and has a different facies to, *H. bada*. Leech says that *Parnara guttata* "Can be easily distinguished from *P. pellucida*, [Murray, originally described from Japan] by its longer, narrower wings, and by the spots of the hindwing, which are almost in a straight line, while

in *P. pellucida* the arrangement is alternate." I have specimens of *P. pellucida* from Western China identified by Mr. Leech, and which agree with Mr. H. Pryer's figure of the species in "*Rhopalocera Niho-nica*," pl. x, n. 11, *female*, also with Dr. O. Staudinger's figure in Romanoff's "*Mémoires sur les Lépidoptères*," vol. iii, pl. viii, fig. 3, *male*, which further differ from *E. guttatus* in the forewing in the lowest of the three subapical spots being moved outwards towards the margin instead of being directly under the other two; the spots in the discoidal cell are larger and not placed immediately above one another but obliquely; and, lastly, the antennæ are absolutely different, the shaft being half as long again as in *E. guttatus*, and the club elongated instead of being short and compressed. The differences in markings may perhaps be considered to be trivial unless shewn to be constant in a long series, but the difference in the antennæ must be specific. But Leech gives "*Hesperia*" *toona*, Moore, as a synonym of *P. pellucida*, which is, I think, incorrect. Watson gives *H. bada* as a distinct species, and places *P. mangala* as a synonym of *P. guttatus*. In this I agree with him. *H. fortunei* is probably distinct, though placed by Leech as a synonym of *E. guttatus*, as noted above. As figured in "*Reise Novara*," *Lepidoptera*, pl. lxxii, fig. 11, *male*, it has the antennæ as long as *P. pellucida*, but differs from that species in having no spots in the discoidal cell of the forewing, and the discal spots of the hindwing arranged in a straight line instead of being placed alternately. I would arrange all these names thus:—

1. *Baoris* (*Parnara*) *toona*, Moore, from the Himalayas, Bhutan, Assam, Burma, the Malay Peninsula, South India, Sumatra, Java, and Celebes.

2. *Baoris* (*Parnara*) *fortunei*, Felder, from Shanghai.

3. *Baoris* (*Parnara*) *pellucida*, Murray, from Japan and Western China.

4. *Baoris* (*Parnara*) *guttatus*, Bremer and Grey.

Pamphila mangala, Moore, from the Western Himalayas, China, and Japan.

5. *Baoris* (*Parnara*) *bada*, Moore.

Pamphila apostata, Snellen, from nearly the whole of India, Ceylon, Burma, Sumatra, and Java.

In *B. toona* there are always two spots in the discoidal cell of the forewing, usually conjoined. In *B. guttatus*, of which I have a good series from the Western Himalayas, Western and Central China, and Japan, there is sometimes a minute spot in the cell (probably this spot is occasionally absent altogether), or two spots, variable in size, but never conjoined. In *B. bada*, there are sometimes no spots, one, or two

spots, never conjoined. This is the smallest and darkest-coloured species of the three. In Sumatra it is somewhat rarer than *B. cahira*, Moore, but occurs throughout the year from Bindjei to the outer hills.

731. BAORIS (*Parnara*) COLACA, Moore.

Originally described from the South Andaman Isles, and figured by Moore and Elwes. It differs from *B. bada*, Moore, in being smaller, with smaller spots on the hindwing, which are also slightly differently arranged. Occurs rarely on the outer hills in November.

732. BAORIS (*Parnara*) PUGNANS, de Nicéville.

Parnara pugnans, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. vi, p. 384, n. 28, pl. G, fig. 30, female (1891).

Originally described from the Malay Peninsula and Nias Island; in Sumatra it occurs at Selesseh, Namoe Oekor, and in the Battak mountains from July to October. It is found also in the island of Pulo Laut.

733. *BAORIS (*Parnara*) CINNARA, Wallace.

Grose Smith. Originally described from Formosa. The description is quite inadequate, and from it the species cannot be identified with certainty.

734. ISMENE ŒDIPODEA, Swainson.

Rare at high elevations south of Bekantschan in June and September.

735. ISMENE ETELKA, Hewitson.

Originally described from Sarawak in Borneo; occurs also in the Ataran Valley, Tenasserim, Burma. The species was described from a female, and is named *Ismene itelka* on the plate. In Sumatra it is very rare at higher elevations near Bekantschan. Three specimens only obtained, one each in March, July, and August.

736. ISMENE HARISA, Moore.

Somewhat rare throughout the year at high elevations from Bekantschan to the Central Plateau. This species was very common, however, in February, 1895, in Indragiri in the plains.

737. *ISMENE STRIATA, Hewitson.

Snellen. Originally described from China.

738. *ISMENE RADIOSA*, Plötz.

I. radiosa, Plötz, Berl. Ent. Zeitsch., vol. xxix, p. 232, n. 35 (1885); idem, id., Stet. Ent. Zeitsch., vol. xlvii, p. 114, n. 2b (1886).

Originally described from Celebes. My identification is based on specimens of this species sent to me so named by Heer M. C. Piepers from Java. A unique example has been obtained in Sumatra near Bekantschan in March.

739. *ISMENE* sp.

Dr. Martin informs me that his brother obtained three male specimens in Indragiri of an *Ismene* allied to *I. iluska*, Hewitson, *I. mahintha*, Moore, *I. antigone*, Röber, and *I. ionis*, de Nicéville. As I have not seen a specimen from Sumatra I cannot determine the species.

740. *HASORA BADRA*, Moore.

Hagen. Grose Smith. Common in the plains, most plentiful in April.

741. *HASORA HADRIA*, de Nicéville.

H. hadria, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. iv, p. 172, n. 10 (1889).

Common in the outer hills and near Selesseh in April, May, September and December.

742. *HASORA CHABRONA*, Plötz.

H. chabrona, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 406, n. 51 (1895).

Rarer than the two foregoing species, occurs near Selesseh and on the outer hills in April and September.

743. *HASORA MYRA*, Hewitson.

Originally described from Java. Occurs in Sumatra throughout the year at high elevations not below 3,000 feet, but never commonly.

744. *HASORA (Parata) CHROMUS*, Cramer.

Common on the outer hills in May and June.

745. *HASORA (Parata) SIMPLICISSIMA*, Mabille.

H. (Parata) simplicissima, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 405, n. 50, pl. Q, figs. 62, male; 63, female (1895).

Occurs not rarely throughout the year at low elevations, in the plains near Selesseh and at Tandjong Djatti.

746. *HASORA (*Parata*) MALAYANA, Felder.

Snellen. Originally described from the Malay Peninsula.

747. HASORA (*Parata*) CELÆNUS, Cramer.

Originally described from Amboina. Rare, found from Selesseh to Bekantschan in January and March.

748. HASORA (*Parata*) CHUZA, Hewitson.

Hagen. Originally described from Sarawak in Borneo. In N.-E. Sumatra it occurs at Selesseh, and on the Battak mountains from Bekantschan to the Central Plateau fairly commonly throughout the year.

749. BIBASIS SENA, Moore.

Flies throughout the year near Selesseh and on the outer hills, most plentiful in April.

750. BADAMIA EXCLAMATIONIS, Fabricius.

Throughout the year in the plains at Selesseh, and on the outer hills near Paya Bakong. The males come to wet spots on roads, where they settle with widely spread wings Dr. Martin notes. Mr. G. C. Dudgeon has recently described the transformations of this species from Bhutan in N.-E. India, in the Journal of the Bombay Natural History Society, vol. x, p. 144 (1895).

751. RHOPALOCAMPTA CRAWFURDI, Distant.

Hagen as *benjamini*. Occurs throughout the year at Selesseh and on the outer hills from Namoe Oekor to Bekantschan and south of that place. Herr O. Puttfarcken once found a larva of this species, and described it as follows:—"Has the typical shape of the larvæ of the *Hesperiidæ*, and is like that of *Erionota thrax*, Linnæus. It lived in a rolled-up leaf, is dark velvety blue with white transverse lines, head and legs yellow, head with three black spots arranged in a triangle."

The following species have been recorded from Sumatra by various authors, but we have not been able to identify them.

752. *TAGIADES SATAMPA.

Hagen. He does not give the name of the describer of this species as he usually does. We are unable to trace it. It is possible that he

means the well-known hesperid genus *Satarupa*, Moore, which occurs in Sumatra, and is not mentioned by him, though he records *Satarupa sambara*, Moore, from Sumatra, under the name of *Tagiades sambara*.

753. *ISOTEINON PERTINAX.

Grose Smith. There is a "*Papilio*" *pertinax*, Stoll, described from Surinam in South America, which is placed by Kirby as a synonym of *Telegonus perviæx*, Hübner. From the figure I cannot find that it resembles any oriental hesperid. There is also a "*Papilio*" *pertinax*, Sepp, from Surinam, which has been re-named *Pamphila schelleri* by Kirby. The book in which it is described and figured is not available to me. Furthermore, there is a "*Papilio*" *pertinax* of Cramer, described from Surinam, which name stands. This species is the type of the genus *Phlebodes*, Hübner.

754. *ISOTEINON MERJA.

Grose Smith. I am unable to trace this species, and Mr. Grose Smith does not say by whom it was described.

755. *PAMPHILA FETTINGI, Möschler.

P. fettingi, Möschler, Verh. zool.-bot. Gesellsch. Wien, vol. xxviii, p. 219, n. 26 (1879).

Originally described from males from Sumatra. From the description it appears to be closely allied to *Padraona pavor*, de Nicéville (*vide* No. 713 *ante*).

756. *HESPERIA TRAVIATA, Plötz.

H. traviata, Plötz, Stet. Ent. Zeit., vol. xlvii, p. 91, n. 75c (1886).

Originally described from Sumatra. It is compared with *Lotongus parthenope*, Weymer, and from the description probably belongs to that genus (*vide* No. 689 *ante*).

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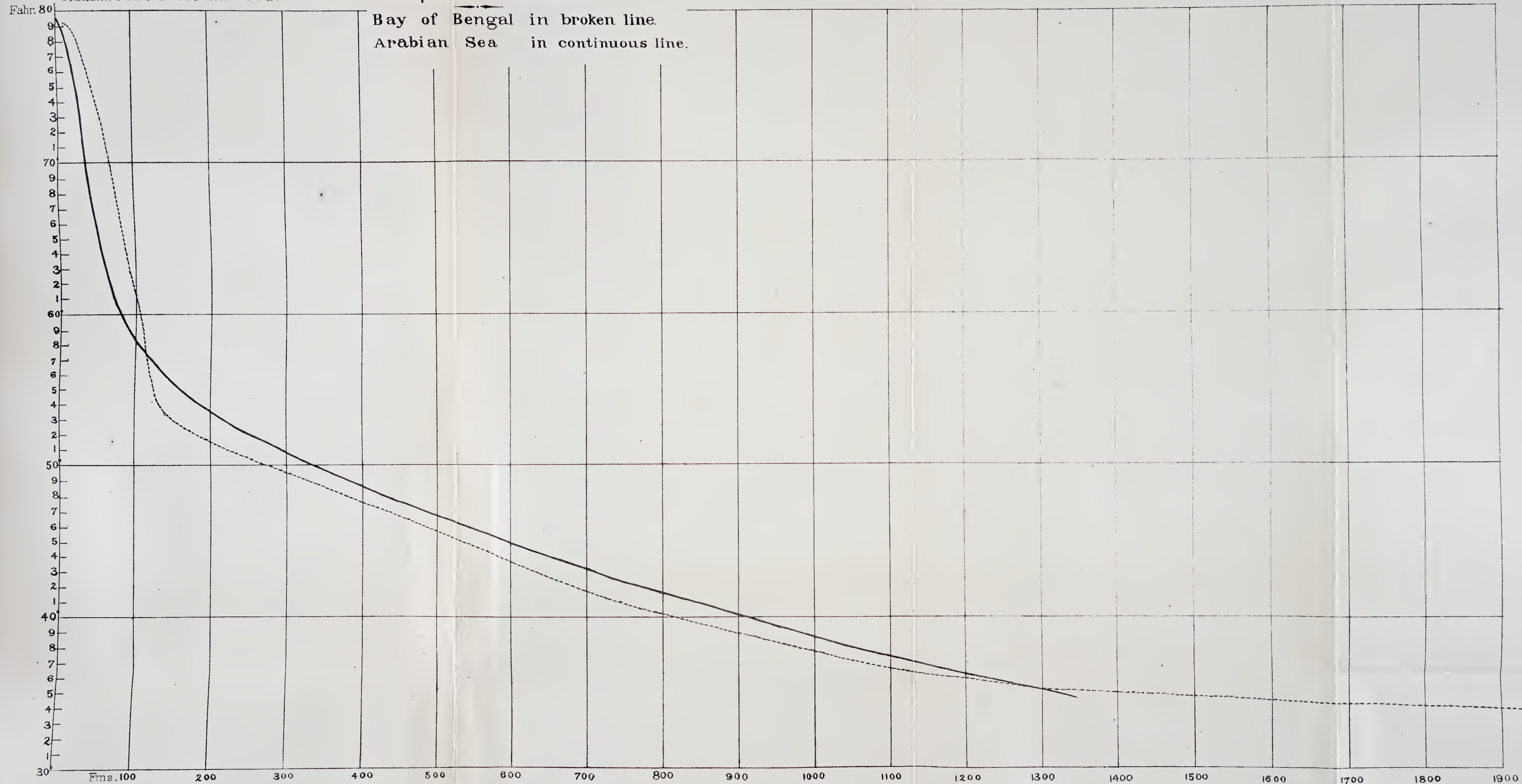


**CONTOUR CHART OF THE ARABIAN SEA
IN THE NEIGHBOURHOOD OF THE LACCADIVE ISLANDS.**

Based on the deep sea soundings of the Marine Survey of India Department.

1894

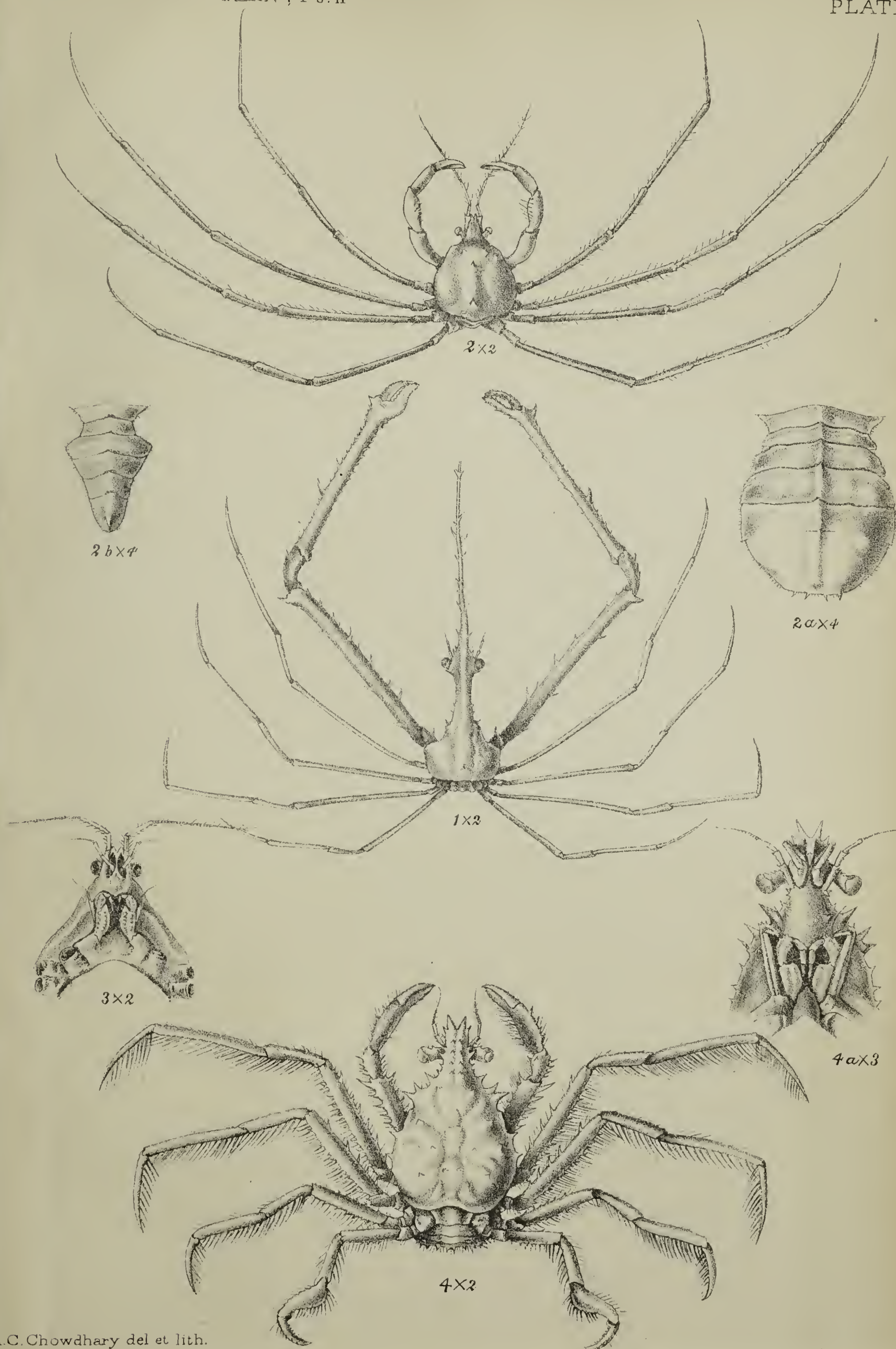
Temperature Curves





AC Clowdbery del & lith.

DRACO NORVILLI



A.C. Chowdhary del et lith.

1. *Lambrachæus ramifer*.

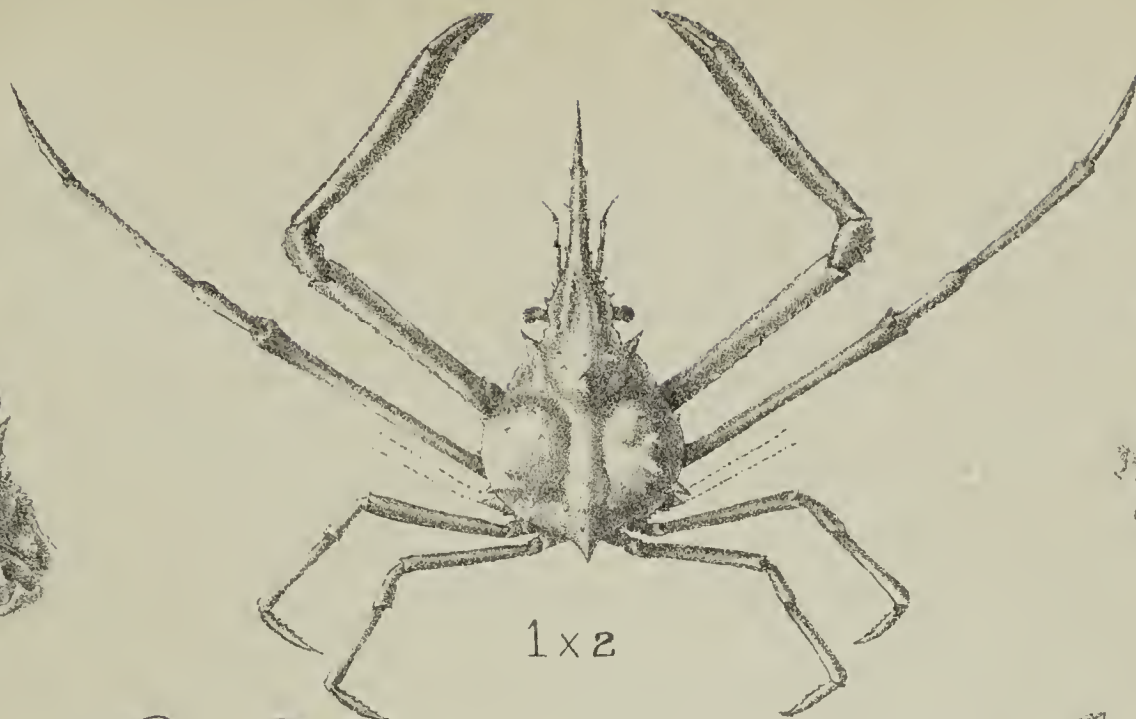
3. *Physachæus tonsor*.

2. *Physachæus ctenurus*.

4. *Grypachæus hyalinus*.



1a x 3



1 x 2



2a x 4



3



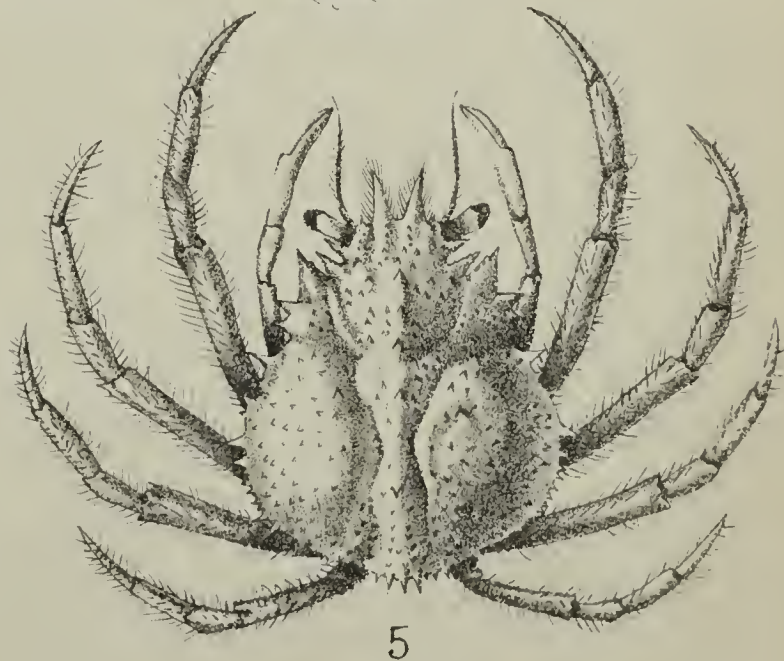
2 x 2



4 x 2



5a x 2



5

Chowdhary & S.C.Mondul del et lith.

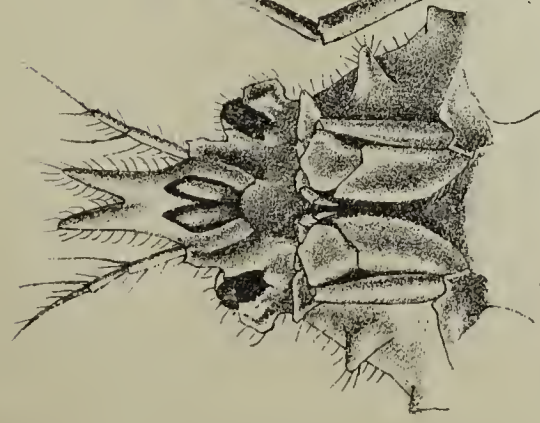
1. *Inachoides dolichorhynchus*.

3. *Naxia investigatoris*.

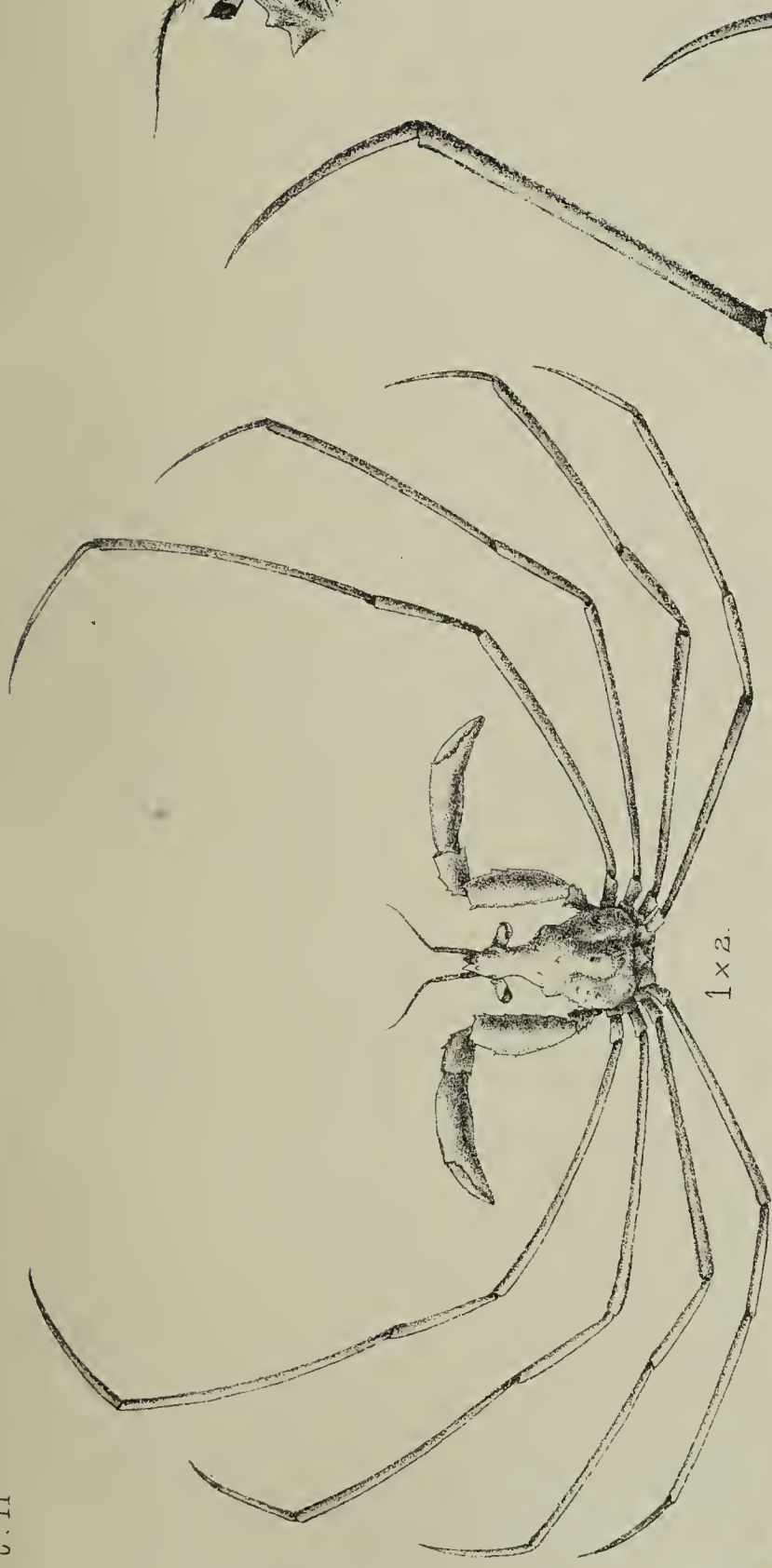
5. *Maia gibba*.

2. *Apocremnus indicus*.

4. *Macrocoeloma nummifer*.



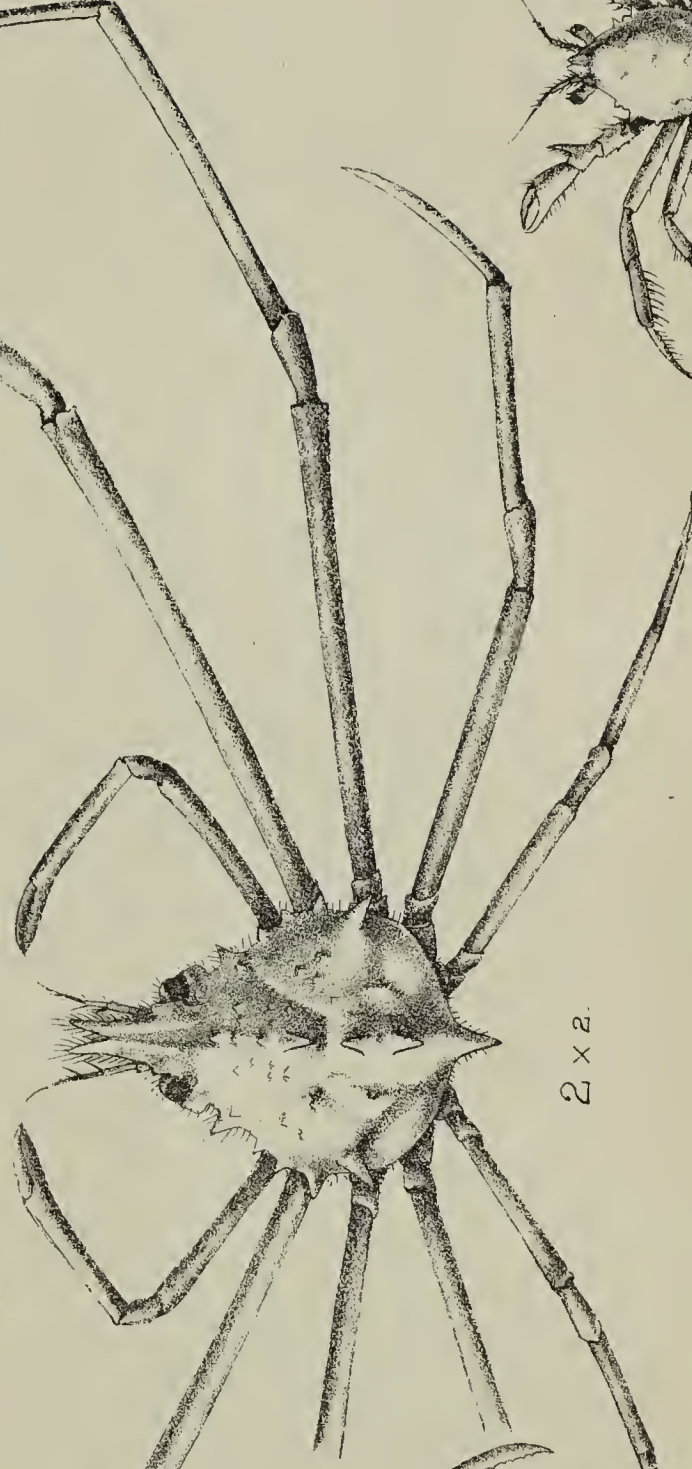
2a x 4.



1 x 2.



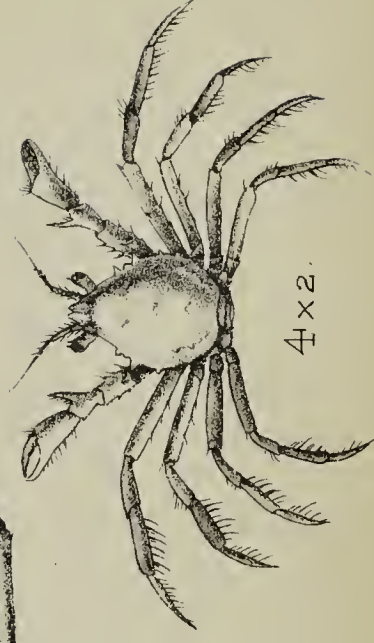
4a x 4.



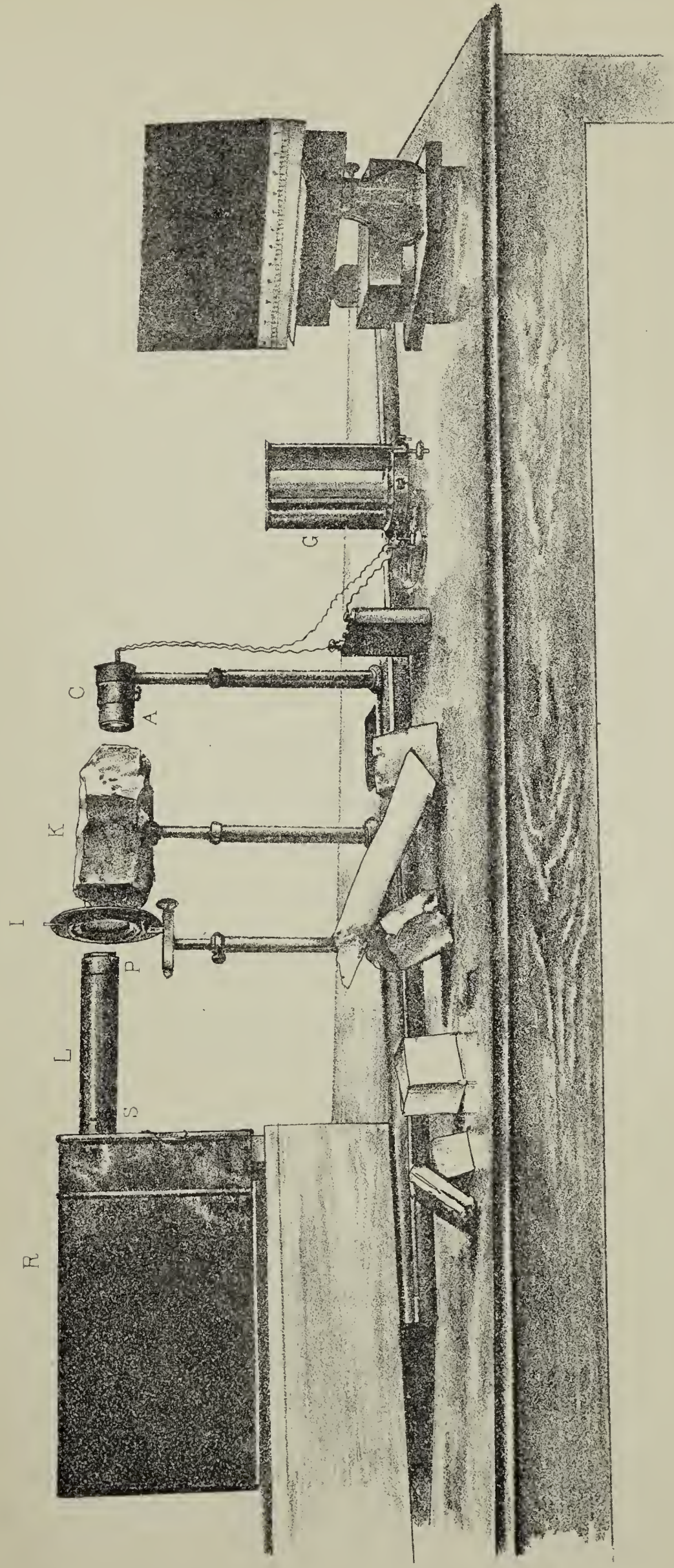
2 x 2.



3 x 10.



4 x 2.



POLARISATION OF ELECTRIC RAY

A Chowdhary Lith.



1



3a



4



3



5

INDIAN LAND SHELLS.

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL.

EDITED BY
THE HONORARY SECRETARIES.

JANUARY TO DECEMBER,
1895.

CALCUTTA :
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1896.

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V.—Ditto Ditto	Ditto

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR JANUARY, 1895.

The Monthly General Meeting of the Asiatic Society of Bengal, was held on Wednesday, the 2nd January, 1895, at 9 P. M.

DR. A. F. R. HOERNLE, Vice-President, in the chair.

The following members were present :—

Surgeon-Major-General A. F. Bradshaw, A. A. Caspersz, Esq., Babu Çarat Candra Dās, C. L. Griesbach, Esq., Babu Çarat Candra Lāhiri, Kumār Rāmeçvar Māliā, J. Mann, Esq., L. de Nicéville, Esq., Paṇḍit Haraprasād Çāstri, C. R. Wilson, Esq., J. G. Woodroffe, Esq.

The minutes of the last meeting were read and confirmed.

Thirty-one presentations were announced, details of which are given in the Library List appended.

The following gentlemen have expressed a wish to withdraw from the Society:—

S. R. Elson, Esq.

Lieutenant W. A. Harrison.

Dr. Kenneth Macleod.

Mr. C. L. Griesbach exhibited some antique beads and stones.

Note on the above by Mr. J. H. Skrine.

At *Sabour*, 5 miles east of Bhagulpur, in an alluvial soil 12 miles from nearest rock formations, are found immense quantities of beads and stones. The time is June, when the rains burst. The soil is thus covered with them and the roads, too, have their quota. The natives

have no tradition as to their history. Sabour is 2 miles south of the present bed of the Ganges, and $\frac{1}{4}$ mile from the old bed (one in use within living memory.)

The following papers were read :—

1. *Buddhism in Bengal, after the Muḥammadan Conquest*.—By PAṆḌIT HARAPRASĀD ÇĀSTRĪ, M.A.

The paper will be published in the *Journal*, Part I.

2. *Note on some remarkable remains in Kashmir*.—By MRS. H. G. M. MURRAY-AYNSLEY. Communicated by the PHILOLOGICAL SECRETARY.

Early in November 1894, shortly before quitting Kashmir after this our fourth visit, I was attracted to the remains of certain old buildings about a mile distant from the European quarter of Sirīnagar. On closer examination, one of these proved to have formerly been a Muḥammadan Ziārat.* Its walls, up to the height of 10 feet, consisted of very large carefully hewn stones apparently laid without mortar. The roof is entirely fallen in. Judging from the dimensions of the beams of wood lying about in the interior, the whole of the upper part of this building must have been of that material. Amongst this debris are one or two tombstones *in situ*, and fragments of others are scattered about. Three or four yards distant from, and parallel with the Ziārat, are the remains of another building of the same character. In this case, the existing stone walls are not more than 4 or 5 feet in height. The whole enclosure is however, much larger than the first named. It contains more than one native dwelling place, the occupants of which appeared to belong to a class superior to that of the ordinary cultivator. These people, on being questioned said, that once upon a time a Mosque stood on this latter site.


Directly in front of the Ziārat, and placed in a sloping position against a rough wall which possibly originally formed its outer enclosure, is a singular stone which one may venture to say could never have belonged to either of the above-named buildings. At first sight, this stone appeared to be circular, but on accurate measurement, it proved to be (allowing for a portion which has been broken off) four feet in diameter one way, and four feet four inches the other. The thickness of this slab is about 10 inches, the under or back side is very roughly hewn, but its upper surface has been very carefully smoothed. All round it, at a distance of one inch and a half from the edge, is a

* A walled enclosure, in which is the tomb of some saint, is thus styled.

distinct trench three inches and a half in width. Within this area, scattered over the surface, are numerous depressions (so called cup-markings), more or less carefully made, and similar to those hollowed stones which if found in Brittany, in the Island of Guernsey, in Cornwall, Scotland or Ireland, would be styled pre-historic cup-markings. Four of these depressions are of considerable size, being at least three inches in diameter and two inches in depth, and remarkably well defined. There are also several smaller cup-marks, some not so deep or so distinct as the others. The natives on the spot, say that this stone is old, old, centuries old; that it has never been used for any purpose by either themselves or their progenitors, so far as their traditions carry them; though they appeared to regard it with a kind of veneration as an object whose use and origin was unknown to them. Indeed its character and general appearance would seem to point to an earlier stage of civilization than any remains we have ever yet seen in Kashmir.

Some interesting and most curious relics of a past age in Kashmir, belonging probably to some of the earlier civilized races inhabiting that country, have recently been discovered in a valley between two spurs of a mountain rising up from the East end of the *Dal* or city lake, and situated four or five miles from Sirīnagar.

These remains have not as yet been properly excavated or examined by experts, and it is therefore impossible at present to give any complete description of them. Suffice it to say, that what has already been uncovered consists of a portion of a circular pavement composed of unglazed terra cotta tiles of large size. This pavement has been described as being about 20 feet in diameter, each tile having a raised design of some animal or animals upon it. I was favoured with a sight of the only two tiles which had been brought into Sirīnagar, and herewith enclose faithful copies (original size) of the designs upon them, executed by a friend who is a clever draughtswoman. The material is rough, and the execution rude, but the attitude of the two game cocks is remarkably spirited. I would venture to call attention to the resemblance which the flower between these two birds (repeated also on other portions of the design), bears to the flower of the Campā or Campak tree, so common in Southern India, but unknown in the Panjab and in Kashmir. Cock-fighting is still a favorite amusement with the Kashmiris. I need hardly add that I should be much gratified and interested by being the recipient of any decision which your Society may arrive at respecting these objects.



LIBRARY.

The following additions have been made to the Library since the meeting held in December last:—

TRANSACTIONS, PROCEEDINGS, AND JOURNALS,

presented by the respective Societies and Editors.

- Bombay. Anthropological Society of Bombay,—Journal, Vol. III, No. 6.
 ———. The Indian Antiquary,—Vol. XXIII, Part 292.
- Buenos Aires. La Academia Nacional de Ciencias en Córdoba,—Boletín, Tome XIII, Entregas 3^a y 4^a.
- Calcutta. Geological Survey of India,—Records, Vol. XXVII, Part 4.
 ———. Indian Engineering,—Vol. XVI, Nos. 23–26.
 ———. Maha-bodhi Society,—Journal, Vol. III, No. 8.
 ———. The Medical Reporter,—Vol. IV, No. 12; Vol. V, No. 1.
 ———. Photographic Society of India,—Journal, Vol. VII, No. 12.
- Christiania. Norske Gradmaalingskommission,—Vandstandsobservationer, Heft 5, 1893.
- Copenhagen. K. Nordiske Oldskrift-Selskab,—Aarbøger, II Raekke, IX Bind, Heft 2.
- Dublin. Royal Irish Academy,—Transactions, Vol. XXX, Parts 13 and 14.
- Havre. Société de Géographie Commerciale du Havre,—Bulletin, Septembre-Octobre, 1894.
- Leipzig. Der Deutschen Morgenländischen Gesellschaft,—Zeitschrift, Band XLVIII, Heft 3.
- London. The Academy,—Nos. 1177–80.
 ———. The Athenæum,—Nos. 3500–3.
 ———. Nature,—Vol. LI, Nos. 1308–11; and Index to Vol. L.
 ———. Numismatic Circular,—Vol. III, No. 25; and Index to Vol. II.
 ———. Royal Geographical Society,—Geographical Journal, Vol. IV, No. 6.
- Paris. Société de Géographie,—Compte Rendu de Séance, No. 16, 1894.
 ———. Société Philomathique de Paris,—Comptes Rendus Sommaire de la Seances, Nos. 2 et 3, 1894.
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presented by the Authors, Translators, &c.

BANERJEE, SREENATH. A brief sketch of the life of Pandit Pran Nath Saraswati. 8vo. Calcutta, 1894.

DUTHIE, J. F. Field and Garden Crops of the North-Western Provinces and Oudh, Part III. 4to. Roorkee, 1893.

LAZARUS, JOHN. A Dictionary of Tamil Proverbs. 8vo. Madras, 1894.

LYMAN, BENJAMIN SMITH. Some Coal Measure Sections near Peytona, West Virginia. 8vo. Philadelphia, 1894.

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Annals of the American Academy of Political and Social Science, Philadelphia, Vol. V, No. 3; and Supplement. 8vo. Philadelphia, 1894.

AMERICAN ACADEMY OF POLITICAL AND SOCIAL SCIENCE,
PHILADELPHIA.

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Guide to the Natural History and Mineral Galleries of the Government Museum, Madras. 8vo. Madras, 1894.

GOVERNMENT MUSEUM, MADRAS.

General Report on Public Instruction in Bengal for 1893-94. Fcp. Calcutta, 1894.

OLDHAM, W. B. Some Historical and Ethnical Aspects of the Burdwan District. 8vo. Calcutta, 1894.

Report on the Rail-borne Traffic of Bengal during the year 1893-94. Fcp. Calcutta, 1894.

Resolution reviewing the reports on the working of the District Boards in Bengal during the year 1893-94. Fcp. Calcutta, 1894.

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Report of the Botanical Survey of India, Vol. I, Nos. 3 and 4. 8vo. Calcutta, 1894.

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Gazetteer of the Lahore District, 1893-94. 8vo. Lahore, 1894.

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MÜLLERS, F. MAX. Sacred Books of the East, Vols. XXXV, XXXVI and XLIX. 8vo. Oxford, 1894.

INDIA OFFICE, LONDON.

The Indian Journal of Education for December, 1894. 8vo. Madras, 1894.

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HIS HIGHNESS THE MAHARAJA OF JAMMU AND KASHMIR.

Verslagen der Zittingen van de wis-en natuurkundige afdeeling der Koninklijke Akademie van Wetenschappen van 27 Mei 1893 tot 21st April, 1894. 4to. Amsterdam, 1894.

DER KONINKLIJKE AKADEMIE VAN WETENSCHAPPEN, AMSTERDAM.

Indian Meteorological Memoirs, Vol. V, Parts 4 and 5. 4to. Calcutta, 1894.

Monthly Weather Review for July and August, 1894. 4to. Calcutta, 1894.

Original Meteorological Observations of Calcutta, Allahabad, Lucknow, Lahore, Nagpur, Bombay and Madras for July and August, 1894. 4to. Calcutta, 1894.

METEOROLOGICAL REPORTER TO THE GOVT. OF INDIA.

Proceedings of the Public Meeting of the Hindu Community, held on Wednesday, the 5th September, 1894, at the Town Hall of Calcutta, to thank Swami Vivekananda and the American People. 8vo. Calcutta, 1894.

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SCHIÖTZ, O. E. Resultate der im Sommer, 1893, in dem nördlichsten Theile Norwegens ausgeführten Pendelbeobachtungen. 4to. Christiania, 1894.

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GRADMESSUNG, CHRISTIANIA.

Return of Wrecks and Casualties in Indian Waters for the year 1893. Fcp. Calcutta, 1894.

PORT OFFICE, CALCUTTA.

Tide-Tables for the Indian Ports for the year 1895, also January, 1896. 8vo. London, 1894.

SURVEY OF INDIA, TIDAL AND LEVELLING OPERATION, POONA.

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Allahabad. North Indian Notes and Queries,—Vol. IV, No. 6.

Calcutta. Indian Medical Gazette,—Vol. XXIX, No. 12.

Geneva. Archives des Sciences Physiques et Naturelles, — Tome XXXII, No. 11.

Leipzig. Annalen der Physik und Chemie, — Band LIII, Heft 5.

———. ———. Beiblätter, Band XVIII, Heft 11.

London. The Chemical News, — Vol. LXX, Nos. 1826–29.

———. Numismatic Circular, — Vol. III, No. 25 ; and Index to Vol. II.

Paris. Revue Scientifique, — 4^e Série, Tome II, Nos. 21–24.

BOOKS PURCHASED.

CUNNINGHAM, MAJOR-GENERAL, SIR A. Coins of Mediæval India. 8vo.
London, 1894.

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR FEBRUARY, 1895.

The Annual Meeting of the Asiatic Society of Bengal was held on Wednesday, the 6th February, 1895, at 9 P.M.

The Hon'ble Sir C. A. ELLIOTT, K. C. S. I.,
Vice-President, in the chair.

The following members were present :—

Dr. A. W. Alcock, T. D. Beighton, Esq., Bābu Çarat Candra Dās, D. Ernst, Esq., G. A. Grierson, Esq., C. L. Griesbach, Esq., Dr. A. F. R. Hoernle, A. Hogg, Esq., The Rev. Fr. E. Lafont, Bābu Çarat Candra Lāhirī, C. Little, Esq., E. D. Maclagan, Esq., J. Mann, Esq., C. R. Marriott, Esq., Dr. F. P. Maynard, W. H. Miles, Esq., L. de Nicéville, Esq., A. Pedler, Esq., Dr. G. Ranking, Paṇḍit Haraprasād Çāstrī, Dr. G. Watt, C. R. Wilson, Esq.

Visitors :—Babu Jñānendranāth Pāl Caudhurī, E. Dubois, Esq., Bābu Dinanāth Gāṅguli, T. Kawakamin, Esq., The Rev. K. S. Macdonald.

According to the Bye-Laws of the Society, the Chairman ordered the Voting papers to be distributed for the election of Officers and Members of Council for 1895, and appointed Dr. George Watt and Bābu Çarat Candra Dās to be Scrutineers.

The CHAIRMAN then called upon the Secretary to read the Annual Report.

ANNUAL REPORT FOR 1894.

The Council of the Asiatic Society have the honour to submit the following Report on the state and progress of the Society's affairs during the past year :—

Member List.

During the year under review 14 Ordinary Members were elected, 13 withdrew, 10 died, two being Life Members ; 4 were removed from the list under Rule 40, being more than 3 years absent from India. There was thus a net loss of 13 Ordinary Members during the year. The total number of Members at the close of 1894, being 295, against 308 at the preceding year ; of these 98 were Resident, 125 Non-Resident, 12 Foreign, 22 Life, 36 Absent from India, and 2 Special non-Subscribing Members, as will be seen from the following table, which also shows the fluctuation in the numbers of the Ordinary Members during the past six years :—

Year.		Paying.				Non-paying.				Grand Total.
		Resident.	Non-Resident.	Foreign.	Total.	Life.	Absent.	Special Non-Subscribing.	Total.	
1889	...	108	135	13	256	22	27	2	51	307
1890	...	105	140	10	255	21	25	2	48	303
1891	...	101	134	10	245	21	27	2	50	293
1892	...	115	127	11	253	22	33	2	57	310
1893	...	116	123	12	251	22	33	2	57	308
1894	...	98	125	12	235	22	36	2	60	295

The ten Ordinary Members, the loss of whom by death during the year we have to regret, were Babu Jñānendra Kumār Rāya Caudhurī, Prince Iskandar ‘Alī Mirzā, General Robert Maclagan (Life Member), Babu Yādulāla Mallika, Bābu Bhudeva Mukerjee, Mr. W. M. Osmond, The Hon. Ayodhyānātha Paṇḍit (Life Member), Mr. John Parry Scotland, Mahāmahopādhyāya Kavirāja Ćyāmalādās, and Kumār Indra Candra Singh.

There were five deaths amongst the Honorary Members, viz., Mr. B. H. Hodgson, Professor H. Milne-Edwards, Dr. Warner Siemens, Dr. Aloys Sprenger, and Professor William Dwight Whitney. To fill these vacancies and others previously existing, the Society, on the recommendation of the Council, elected as Honorary Members, Sir William Henry Flower, Dr. Edward Frankland, Monsieur Louis Pasteur, Sir George Gabriel Stokes, Mahāmahopādhyāya Candrakanta Tarkālaṅkāra, Professor Theodor Noeldeke, and Dr. Reinhold Rost. Thus the number of Honorary Members stands at 22.

The lists of Special Honorary Members, Corresponding Members, and Associate Members, continue unaltered from last year, there having been no casualties. Their numbers stand at 5, 6, and 10, respectively.

During the year two Members, Mr. E. D. Maclagan and Surgeon-Captain W. Vost, compounded for their future subscriptions; but as two Life-Members, General R. Maclagan and the Hon'ble Ayodhyānātha Paṇḍit died, the total number of Life-Members remains the same as it was at the close of 1893.

Indian Museum.

No Presentations were made over to the Indian Museum.

The Trustees on behalf of the Society were :—

Dr. A. F. R. Hoernle.

A. Pedler, Esq.

Dr. D. D. Cunningham.

C. Little, Esq.

Dr. Mahendralāl Sarkār.

Finance.

The Accounts of the Society are shown in Statement No. 1, in the Appendix, under the usual heads.

Statement No. 8 contains the Balance Sheet of the Society and of different funds administered through it.

The Budget Estimate for 1894 was taken at the following figures :—Receipts, Rs. 17,576-0-0; Expenditure, Rs. 16,993-0-0.

The actual results were found to be :—Receipts, Rs. 17,442-12-0; Expenditure, Rs. 17,875-14-4.

The Receipts thus show a decrease of Rs. 133-4-0, while the Expenditure shows an increase of Rs. 882-14-4 on the Budget Estimate.

The increase in Receipts is under the heads of "Interest on Investments" and "Rent of Rooms." "Interest on Investments" was estimated at Rs. 5,456; the actuals have been Rs. 6,307-10-6. The increase of Rs. 851-10-6 has arisen from the transfer of the Government Promissory Notes, from the 4 per cent. to the $3\frac{1}{2}$ per cent. loan, the Government having paid in advance the excess interest of $\frac{1}{2}$ per cent. Owing to the payment in this year of two months' rent due last year by the Photographic Society of India, "Rent of Rooms" shows an increase of Rs. 120.

The loss of Members during the past year being somewhat larger than usual, the receipts from "Subscriptions" are below the estimated amount by Rs. 431-14-0. Messrs. Kegan Paul, Trench, Trübner & Co. not having submitted their accounts, there appears a reduction of

Rs. 153-10-6 under the head of "Sale of Publications." The difference between the estimated and actual receipts, under the head of "Government Allowances," is due to the grant from the Government of Madras for Part III of the Society's Journal, dealing with Anthropology, Ethnology, and Folklore, not having been received during the year.

On the Expenditure side, the items of "Binding," "Journal, Part I," "Journal, Part II," and "Proceedings," show an increase. The heavy increase in the "binding" is due to a third set of the Society's "Asiatic Researches," "Journals," and "Proceedings" having been bound for the Society's Library, and to the binding of some old works. The budget grant for "Journal, Part I," has been exceeded by Rs. 408-4-6; this is owing to the payment for the printing of the maps illustrating Major Raverty's article on the "Mihran of Sind and its Tributaries." The expenditure on "Journal, Part II," shows an increase of Rs. 1,141-8-9, caused chiefly by the payment of £68-11 for plates, to Messrs. West, Newman & Co. Owing to the Baptist Mission Press having been paid for the printing of eleven numbers of the "Proceedings" instead of ten, as usual, there is a slight increase of Rs. 253-8-6 under this head.

An Expenditure of only Rs. 807-4-8 appears under the head of "Books," in consequence of the non-receipt of Messrs. Kegan Paul, Trench, Trübner and Co's accounts, the books purchased through the London Agents amounting to £67-13-10.

There were two extraordinary items of expenditure during 1894, under the heads of "Repairs" and "Furniture," not provided for in the Budget. Rs. 1,761-6-0 was spent in cleaning and renovating the oil paintings belonging to the Society and in repairing the cane matting. Four almirahs were removed from the stock-room to the Library, and the necessary repairs cost Rs. 199.

The actual expenditure on the "Journal" and "Proceedings" was as follows:—

				Rs.	As.	P.
<i>Journal</i>	...	Part I.	...	...	2,508	4 6
		Part II.	...	...	3,241	8 9
		Part III.	...	...	1,426	5 9
<i>Proceedings</i>...			...	...	1,253	8 6
Total				...	8,429	11 6

This is less than the Budget Estimate by Rs. 270-5-6. Only one number of the *Journal*, Part III, was issued for 1894.

The Budget Estimate of probable ordinary Receipts and Expenditure for 1895 has been fixed as follows:—Receipts, Rs. 16,844; Expenditure, Rs. 16,013.

On the 'Receipts' side, the estimate, under the head of "Subscriptions," has been reduced by Rs. 400, taking into account the unusual loss of Members during last year. "Interest on Investments" shows a reduction of Rs. 332, owing to the transfer of the Government Promissory Notes from the four per cent. to the $3\frac{1}{2}$ per cent. loan. The amount of Rs. 500 not having been received during the year from the Government of Madras, the item under the head of "Government Allowances" has not been altered.

On the Expenditure side, the items of "Lighting," "Freight," and "Local Periodicals" have been slightly decreased. "Stationery" has been decreased by Rs. 50, the compilation of the Society's Library Catalogue being far advanced. The item of "Postage" has been reduced by Rs. 50; as the expenditure of last year has been smaller than usual. There is a reduction of Rs. 500 in the budget under the head of *Journal*, Part III, which provides only for printing charges. This sum has been distributed under the heads of "Postage," "Contingencies," and "Printing Circulars" to provide for such expenses in connection with the third part of the *Journal*.

Beyond the Auditor's fee no other extraordinary expenditure is anticipated during 1895.

The details of the Budget Estimate are as follows:—

RECEIPTS.

			Rs.	As.	P.
Subscriptions ...	...	...	7,000	0	0
Sale of Publications ...	...	...	400	0	0
Interest on Investments ...	...	...	5,124	0	0
Rent of Rooms ...	...	...	720	0	0
Government Allowances ...	...	...	3,500	0	0
Miscellaneous ...	...	...	100	0	0
Total			16,844	0	0

EXPENDITURE.

Salaries ...	...	...	3,400	0	0
Commission ...	...	...	400	0	0
Pensions ...	...	...	48	0	0
Stationery ...	...	...	100	0	0
Lighting ...	...	...	40	0	0
Municipal Taxes ...	...	...	819	0	0
Postage ...	...	...	600	0	0
Carried over			5,407	0	0

	Brought forward	...	5,407	0	0
Freight	...	...	10	0	0
Meetings	...	...	80	0	0
Contingencies	...	...	150	0	0
Books	...	...	1,500	0	0
Local Periodicals	...	...	16	0	0
Binding	...	...	500	0	0
<i>Journal</i> , Part I.	...	...	2,100	0	0
„ Part II.	...	...	2,100	0	0
„ Part III.	...	...	3,000	0	0
<i>Proceedings</i>	...	...	1,000	0	0
Printing Circulars, &c.	...	...	150	0	0
Total			...	16,013	0 0

London Agency.

Messrs. Kegan Paul, Trench, Trübner & Co. not having submitted their accounts with the Society during the year, nothing can be said about the sales made by them of the Society's publications, or of the amount due to or by the Society. No remittance was made to them during the year.

The number of copies of parts of the *Journals*, of the *Proceedings*, and of the *Bibliotheca Indica*, sent to the agents, during 1894 for sale, were 355, 180, and 90, valued @ £53-5-0d., £6-15-0d., and Rs. 92-8-0, respectively.

Eight invoices of books purchased, and of publications of various Societies sent in exchange, were received during the year. The value of the books purchased amounted to £67-13-10.

Change of the London Agency.

From the beginning of 1895 the Council has transferred the London Agency of the Society,—from Messrs. Kegan Paul, Trench, Trübner & Co. to Messrs. Luzac & Co.

Continental Agency.

The number of copies of parts of the *Journal*, of the *Proceedings*, and of the *Bibliotheca Indica*, sent to Mr. Otto Harrassowitz, the Society's Continental Agent, during 1894 for sale, were 160, 2, and 213, valued @ £40-11-6, £0-1-6, and Rs. 122-12-0, respectively. Other books were sent for sale amounting to Rs. 18.

Library.

The total number of volumes, or parts of volumes, added to the Library during the year was 2,059, of which 610 were purchased and 1,449 presented, or received in exchange for the Society's publications.

In last year's Report it was stated that a new edition of the Society's Library Catalogue had been taken in hand, and the compilation had been entrusted to Mr. J. H. Elliott, the Assistant Secretary of the Society. On examination, it was found necessary to check the books with the present Catalogue. Two-thirds of the books have been carefully checked, and it is hoped before the close of the year the work will be accomplished.

Publications.

There were published, during the year, ten numbers of the "Proceedings" (No. 10 of 1893, and Nos. 1 to 9 of 1894), containing 157 pages of letter-press and 1 plate; four numbers of the *Journal*, Part I (No. 4 of 1893, and Nos. 1 to 3 of 1894), containing 218 pages of letter-press and 7 plates; four numbers of the *Journal*, Part II (No. 3 of 1893 and Nos. 1 to 3 of 1894), containing 290 pages of letter-press and 9 plates; two numbers of the *Journal*, Part III (No. 3 of 1893 and No. 1 of 1894), containing 82 pages of letter-press and 6 plates. The Annual Address of the President was printed separately from the *Proceedings*, and contained 85 pages of letter-press. Indexes to the *Journal*, Parts I and II, for 1893, were also published.

Coin Cabinet.

During the year 70 coins were added to the Cabinet, of which 34 were of silver and 36 of copper. Of these coins 66 were acquired under the Treasure Trove Act. The remaining 4 were presentations from the Bombay Government under the Treasure Trove Act. The total comprises Moghuls (silver), 25; so-called Pathans (copper), 36; Bengal independent Sultans (silver), 2; Assamese (silver), 6; Jayantipur (silver), 1. They all belong to well-known, types and detailed notices of them will be found in the Society's Proceedings.

Office of Secretaries.

Dr. G. A. Grierson performed the duties of Philological Secretary and Editor of the *Journal*, Part I, till April, when he was absent on leave, and Dr. A. F. R. Hoernle took charge of the work.

Dr. J. H. Tull Walsh carried on the duties of Natural History Secretary and Editor of the *Journal*, Part II, till April, when he resigned, and Dr. A. W. Alcock was appointed.

Dr. Alcock carried on the duties of the Anthropological Secretary and Editor of the *Journal*, Part III, till April, when he resigned, and Dr. Walsh was appointed. Dr. Walsh continued for one month, when he left India on furlough, and since the appointment has been vacant.

Mr. C. Little held the Treasurership from January to March, when he was absent on leave, and Mr. A. Pedler officiated for him as Treasurer.

Mr. C. R. Wilson carried on the duties of the General Secretary and Editor of the *Proceedings* during the year.

Mr. J. H. Elliott continued Assistant Secretary and Librarian throughout the year.

There were no changes in the posts of Assistant Librarian, Cashier, Paṇḍit, and Copyist, which were held by the permanent incumbents,—Bābu Yogeṣa Candra Chatterji, Bābu Nritya Gopāl Vasu, Paṇḍit Harimohan Vidyābhāṣaṇa, and Babu Nanī Lāl Mānnā.

Bibliotheca Indica.

Sixteen fasciculi were issued during the year, of which five were in the Arabic-Persian, one in the Tibetan, and ten in the Sanskrit series. They belong to nine different works. Three works came to a close, namely, the English translation of the *Ain-i-Akbari*, the *Maāsir-ul-Umārā*, and the ten Arabic poems.

The Philological Secretary exercises complete control over the publication. No new fasciculus was undertaken without his permission.

The expenditure of the Oriental Publication Fund during the year is Rs. 7,880-14-0. It includes the printing charges for 17 and editing charges for 14 fasciculi, giving the average Rs. 436 for each fasciculus. This leaves a balance of Rs. 8,368-9-9 to the credit of the Fund at the end of the year. Of this about Rs. 2,000 is already hypothecated for publications not yet paid for.

The following is a descriptive catalogue of publications issued during the year 1894:—

A. ARABIC-PERSIAN SERIES.

1. *Ain-i-Akbari*, the constitutional history of the Mughal Empire in Akbar's time, by Abūl-Faẓl, one of the great learned men of his court. The first volume of the work was translated by the late Mr. Blochmann, with notes. Since his death the work was in abeyance for a long time. Colonel H. S. Jarrett undertook the translation of the last two volumes at the request of the Council, and completed it before his retirement last year. The work is a complete Gazetteer of the Mughal Empire in Akbar's time and contains not only valuable historical and geographical information, but administrative details of immense value. Three fasciculi were issued during the year, namely, Vol. III., Fasc. III., IV., V., the last of which contains a complete index.

2. *Maāsiru-l-Umārā*, or a history of the Great Nobles of the Mughal Court during the first half of the eighteenth century, by Shāh Nuwāz Khān. He played a conspicuous part in the affairs of the Deccan, and for his generous act of self-sacrifice, in saving the life of Nasir Jang, was obliged to live in concealment and obscurity for seven years, during which time he wrote this great work. Three volumes of the work have been published, but without indices. The index to the first volume appeared during the year under review in two fasciculi, Vol. I. Fasc. X. and XI., under the Editorship of Maulvi Mirza Ashraf Ali.

3. A Commentary by Abū Zakariā Yahyā At-Tibrīzī on the ten ancient Arabic poems, was completed during the year under review by C. J. Lyall, Esq., C.S., President of the Society. The poems all belong to a period before Muḥammad, but the Commentary is post-Muḥammadan. The edition is based on MSS. at Cambridge, Leyden, and London.

B. SANSKRIT SERIES.

1. *Aitareya Brāhmaṇa* is after the *Rig-veda*, the oldest Vedic work known. It was published with an English translation, about 50 years ago, by M. Haug. Paṇḍit Satyavrata Sāmaçramī has undertaken to publish the work with Sáyana's Commentary, references and indices. It has advanced by three fasciculi, Vol. I., Fasc. I., II., and III.

2. *Çrauta sūtra* of *Çāmkhāyana* has advanced by one fasciculus only under the Editorship of Professor Dr. Alfred Hillebrandt of Breslau. It contains Varadattasuta Ānartīya's Commentary on one of the later chapters of the work. Vol. III., Fasc. II.

3. *Taittirīya Saṁhitā*, or the Black *Yajurveda*, has changed hands. Mahāmahopādhyāya Maheça Candra Nyāyaratna, C.I.E., having resigned the Editorship, the work was made over to Paṇḍit Satyavrata Sāmaçramī, who has published one fasciculus only during the year under review, *viz.*, Fasc. XXXVII.

4. *Tattva-cintā-maṇi*, by Gaṅgeçôpādhyāya, who composed his great work on Logic and Philosophy about 750 years ago, with a view to dispel the darkness produced by heretics, — *Pracaṇḍa-pāṣaṇḍa tamastitīr-ṣayā*, — has advanced by one fasciculus only, namely, Vol. IV., Fasc. I. The fourth volume deals with the *Çabdakhaṇḍa*, *i.e.*, the evidential value of words or speech.

5. *Vṛhat Svayambhū Purāṇa* is the only Buddhist Purāṇa known. It deals with the sacredness of various spots in the Svayambhū Kṣetra and other parts of the Valley of Nepal. It is a store-house of legends on Nepal Buddhism. It has advanced by three fasciculi under the Editorship of Paṇḍit Haraprasād Çāstrī Fasc. I, II and III.

C. TIBETAN SERIES.

1. Avadāna Kalpalatā, by Kṣemendra, the great Kāçmīrī poet of the tenth century, published with a Tibetan translation to help the study of the latter language through the medium of Sanskrit, has advanced by two fasciculi under the joint Editorship of Bābu Çarat Candra Dās and Paṇḍit Harimohan Vidyābhūṣaṇa, namely, Vol. I., Fasc. IV., and Vol. II., Fasc. III. The two volumes are being published simultaneously.

2. Pag-Sam Ṭhi S'iṇ, a prose abstract of the above in modern Tibetan, has advanced by one fasciculus only under the distinguished Editorship of Bābu Çarat Candra Dās, C.I.E., viz., Fasc. IV.

List of all Societies, Institutions, &c., to which the Publications of the Asiatic Society have been sent during the year, or from which publications have been received.

* Societies, &c., which have received the Asiatic Society's publications, and have sent their publications in return.

† Societies, &c., which have received the Asiatic Society's publications, but have sent none in return.

§ Societies, &c., whose publications have been received, but to which nothing has been sent in return.

* Allahabad :—Editor, *Pioneer*.

† Amsterdam :—Royal Zoological Society.

* ——— :—Koninklijke Akademie van Wetenschappen.

* Angers :—Société d' Etudes Scientifiques d' Angers.

* Baltimore :—Johns Hopkins University.

* Batavia :—Society of Arts and Sciences.

* ——— :—Kon Natuurkundige Vereeniging in Nederlandsch-Indië.

* Berlin :—Gesellschaft Naturforschende Freunde zu Berlin.

* ——— :—Royal Academy of Sciences.

† Berne :—Société Suisse d' Entomologie.

* Bombay :—Bombay Anthropological Society.

* ——— :—Bombay Branch, Royal Asiatic Society.

* ——— :—Editor, *Indian Antiquary*.

* ——— :—Editor, *Times of India*.

* ——— :—Natural History Society.

* Bordeaux :—L' Académie Nationale des Sciences, Belles-Lettres et Arts.

* ——— :—Société Linnéenne.

† Boston :—Natural History Society.

§ ——— :—American Oriental Society.

* Brisbane :—Royal Society of Queensland.

- † Brookville:—Society of Natural History.
- * Brunswick:—Verein für Naturwissenschaft.
- † Brussels:—L' Académie Royale des Sciences.
- † ———:—Musée Royal d' Histoire Naturelle de Belgique.
- * ———:—Société Entomologique de Belgique.
- † Budapest:—Hungarian Central Bureau for Ornithological Observations.
- * ———:—Royal Hungarian Academy of Sciences.
- † Buenos Ayres:—National Museum.
- * ———:—Academia Nacional de Ciencias de la Republica Argentina.
- * Caen:—Société de Linnéenne de Normandie.
- † Calcutta:—Agri-Horticultural Society of India.
- * ———:—Geological Survey of India.
- * ———:—Editor, *Englishman*.
- * ———:—Editor, *Indian Daily News*.
- § ———:—Editor, *Indian Engineer*.
- § ———:—Editor, *Indian Engineering*.
- * ———:—Editor, *Indian Mirror*.
- * ———:—Editor, *Medical Reporter*.
- * ———:—Indian Museum.
- § ———:—Mahabodhi Society.
- † ———:—Mahomedan Literary Society.
- § ———:—Microscopical Society.
- § ———:—Photographic Society of India.
- * ———:—Survey of India.
- * ———:—Tuttobodhini Shova.
- * ———:—University Library.
- * Cambridge:—University Library.
- * Cassel:—Der Verein für Naturkunde.
- † Cherbourg:—Société Nationale des Sciences Naturelles.
- * Chicago, Ill.:—Editor, *American Antiquarian and Oriental Journal*.
- * Christiana:—University Library.
- * Colombo:—Ceylon Branch, Royal Asiatic Society.
- * Copenhagen:—La Société Royale des Antiquaires du Nord.
- † Cuttack:—Cuttack Library.
- † Danzig:—Naturforschende Gesellschaft.
- * Dehra Dun:—Great Trigonometrical Survey.
- * Dresden:—Entomologischen Vereins "Iris."
- * ———:—Königlichen Zoologischen und Anthropologisch-Ethnographischen Museums zu Dresden.
- * Dublin:—Royal Dublin Society.
- * ———:—Royal Irish Academy.

- * Edinburgh :—Royal Society.
- § ——— :—Royal Physical Society.
- † ——— :—Scottish Geographical Society.
- * Florence :—Società Italiana di Anthropologia, Etnologia e Piscologia Comparata.
- * ——— :—Società Africana d'Italia.
- * Frankfurt :—Senckenbergische Naturforschende Gesellschaft.
- * ——— :—Naturwissenschaftlichen Vereins des Regierungsbezirks.
- * Geneva :—Société de Physique et d'Histoire Naturelle.
- † Genoa :—Museo Civico di Storia Naturale.
- † Giessen :—Oberhessische Gesellschaft für Natur und Heilkunde.
- * Graz :—Naturwissenschaftlichen Verein für Styria.
- * Hague :—Köninklijk Instituut voor de Taal-Land-en Volkenkunde van Nederlansch-Indië.
- * ——— :—Netherlands Entomological Society.
- * Hamburgh :—Naturhistorisches Museum zu Hamburgh.
- * ——— :—Naturwissenschaftlichen Verein.
- † Halle :—Deutsche Morgenlandische Gesellschaft.
- * ——— :—Kaiserlichen Leopoldinisch-Carlinische Akademie.
- * Hamilton (Canada) :—Hamilton Association.
- * Havre :—Société de Géographie Commerciale du Havre.
- * Helsingfors :—Societas pro Flora et Faunna Fennica.
- † ——— :—Société des Sciences de Finlande.
- § Ithaca (U. S. A.) :—Cornell University.
- † Kiev :—Société des Naturalistes.
- * Königsberg :—Die Physikalische-Oekonomische Gesellschaft.
- * Lahore :—Editor, *Civil and Military Gazette*.
- † ——— :—Agricultural Society.
- § Leipzig :—Deutsche Morgenlandische Gesellschaft.
- § ——— :—Der K. Sächsischen Gesellschaft der Wissenschaften.
- † Leyden :—Royal Herbarium.
- * Liège :—Société Géologique de Belgique.
- † ——— :—Société des Sciences.
- † Liverpool :—Literary and Philosophical Society.
- * London :—Anthropological Institute.
- * ——— :—Editor, *Academy*.
- * ——— :—Editor, *Athenæum*.
- * ——— :—British Museum.
- * ——— :—Geological Society.
- * ——— :—Institution of Civil Engineers.
- * ——— :—Institution of Electrical Engineers.
- * ——— :—Institution of Mechanical Engineers.

- * London :— Editor, *Nature*.
- § ———:— Editor, *Numismatic Circular*.
- * ———:— Linnean Society.
- * ———:— Royal Asiatic Society of Great Britain and Ireland.
- * ———:— Royal Astronomical Society.
- * ———:— Royal Geographical Society.
- * ———:— Royal Institution of Great Britain.
- * ———:— Royal Microscopical Society.
- * ———:— Royal Society.
- * ———:— Statistical Society.
- * ———:— Zoological Society.
- † Lyons :— La Société d' Agriculture, d' Histoire Naturelle et des Arts Utiles.
- † ———:— Muséum d' Histoire Naturelle.
- * ———:— La Société d' Anthropologie.
- † Madison, Wiss :— Wisconsin Academy of Sciences, Arts and Letters.
- † Madras :— Literary Society.
- * ———:— Government Central Museum.
- § ———:— Editor, *Indian Journal of Education*.
- § Melbourne :— Royal Society of Victoria.
- * Manchester :— Literary and Philosophical Society.
- * Mexico :— Sociedad Científica " Antonio Alzate."
- * Moscow :— Société Imperiale des Naturalistes.
- * Munich :— K. Bayerische Akademie der Wissenschaften.
- * Nantes :— Société des Sciences Naturelles de L' ouest de la France.
- † Naples :— Società Africana d' Italia.
- † New Haven :— Connecticut Academy of Arts and Sciences.
- † Newport (R. I.):— Natural History Society.
- † New York :— American Museum of Natural History.
- * Ottawa :— Geological and Natural History Survey of the Dominion of Canada.
- † Oxford :— Bodleian Library.
- † ———:— Indian Institute.
- * Paris :— Société de Géographie.
- * ———:— Société d' Anthropologie.
- * ———:— Société Asiatique.
- § ———:— Société Philomathique.
- * ———:— Musée Guimet.
- † ———:— National Library.
- * ———:— Société Zoologique.
- † ———:— Société Académique Indo-Chinoise.
- * ———:— Museum d' Histoire Naturelle.

- * Pennsylvania :—University of Pennsylvania.
- * Philadelphia :—Academy of Natural Sciences.
- † ——— :—Editor, *Journal of Comparative Medicine and Surgery*.
- * Pisa :—Société Toscana di Scienze Naturali.
- § Prague :—K. K. Sternwarte.
- § Rome :—Société degli Spettroscopisti Italiani.
- § Roorkee :—Editor, *Indian Forester*.
- * St. Petersburg :—Comité Géologique.
- † ——— :—Imperial Library.
- * ——— :—Russian Geographical Society.
- * ——— :—Académie Impériale des Sciences.
- † ——— :—Jardin Impériale de Botanique.
- § ——— :—Société Impériale de Mineralogique.
- * San Francisco :—Californian Academy of Arts and Sciences.
- * Santiago :—Deutsche Wissenschaftliche Vereines.
- § Schaffhausen :—Swiss Entomological Society.
- * Shanghai :—China Branch, Royal Asiatic Society.
- † Simla :—United Service Institution of India.
- † Stettin :—Entomological Society.
- * Stockholm :—Entomologische Tidskrift.
- * ——— :—Royal Swedish Academy of Sciences.
- * Sydney :—Royal Society of New South Wales.
- * ——— :—Linnean Society of New South Wales.
- § Taiping :—Government of Perak.
- * Toronto :—Canadian Institute.
- * Tokyo :—Imperial University of Japan.
- * Trieste :—Société Adriatica di Scienze Naturale.
- † ——— :—Museo Civico di Storia Naturale.
- * Tring :—Zoological Museum.
- * Turin :—Reale Accademia delle Scienze.
- † Ulwar :—Ulwar Library.
- * Vienna :—Anthropologische Gesellschaft.
- * ——— :—K. K. Akademie der Wissenschaften.
- * ——— :—K. K. Geologische Reichsanstalt.
- * ——— :—K. K. Naturhistorische Hofmuseums.
- * ——— :—K. K. Zoologisch-Botanische Gesellschaft.
- † ——— :—Ornithologische Verein.
- † Washington :—Commissioners of the Department of Agriculture.
- * ——— :—Smithsonian Institution.
- * ——— :—United States Geological Survey.
- § ——— :—United States National Museum.
- * Wellington :—New Zealand Institute.

- * Wellington :—Polynesian Society.
 - * Yokohama :—Asiatic Society.
 - * ——— :—Deutsche Gesellschaft für Natur und Völkerkunde Ostasiens.
 - † Zagreb :—Archæological Society.
 - * Zurich :—Naturforschenden Gesellschaft.
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ABSTRACT OF PROCEEDINGS OF COUNCIL DURING 1894.

February 1st, Ordinary Meeting.

On an application from the Librarian, Physical Economical Society of Königsberg, it was ordered that all the available publications of the Society wanting in their set should be supplied.

On the recommendation of the Natural History Secretary, it was agreed that the Society's *Journal*, Part II, should be exchanged for the publications of the Hungarian Central Bureau for Ornithological Observations, Budapest.

The acceptance by Dr. A. W. Alcock of the duties of the Anthropological Secretaryship, during the absence of the Hon. Mr. H. H. Risley, was recorded.

The request of Mr. F. E. Pargiter to continue the translation of the "Mārkaṇḍeya Purāṇa" was agreed to, and his name was placed on the Philological Committee.

On the recommendation of the Philological Committee, Surgeon-Major George Ranking was invited to continue the translation of "Muntakhabu-t-Tawarikh" for the Bibliotheca Indica, in the place of Major E. Noel, proceeding to England.

The grant for printing Major Raverty's article on The "Mihran of Sind and its Tributaries," as recommended by the Finance Committee, was included in the budget for 1894.

The budget of the expenses of the *Bibliotheca Indica*, drawn up by the Philological Committee for the year 1894, was approved.

In reply to an application from Paṇḍit Madhusūdan Smritiratna, asking permission to edit the "Smṛiti-Candrikā" for the Bibliotheca Indica, he was informed that the work had been approved by the Philological Committee and placed on the list of works sanctioned by the Council, but not taken in hand.

The question of filling up of vacancies in the Honorary Membership of the Society was referred to a Committee composed of Mr. C. J. Lyall, Mr. A. Pedler, Colonel J. Waterhouse, Dr. A. F. R. Hoernle, Dr. Alcock, and Mahāmahopādhyāya Maheṣa Candra Nyāyaratna.

The purchase of several books was sanctioned for the Society's library.

On an application from the menial servants of the Society praying for slight increase of pay, owing to the scarcity of grain, the Secretary was empowered to make enquiries from the Bengal Secretariat and grant compensation on the same scale and for the same period.

The Treasurer was authorized to buy Government 4 per cent. paper up to Rs. 10,000.

March 1st, Ordinary Meeting.

The President, International Congress of Orientalists, Geneva, was informed, in reply to his letter, that the Society would endeavour to depute a representative, or representatives, to the meeting.

Surgeon-Major Ranking agreed to undertake the translation of "Muntakhabu-t-Tawarikh" for the Bibliotheca Indica.

In reply to a letter from the Chairman of the Organizing Committee of the Sixth International Geographical Congress at London, permission was readily given to place the name of the President of the Asiatic Society of Bengal on the list of Honorary Vice-Presidents of the Congress in 1895.

The purchase of several books for the Society's library was sanctioned.

A sub-committee composed of Colonel Waterhouse and Colonel H. S. Jarrett was appointed to consider the question of repairing the Society's pictures, with power to invite the advice of Mr. E. V. Westmacott.

With reference to the council order, dated 31st August 1893, sanctioning the appointment of an assistant on Rs. 13, for six months, for the purpose of putting the stock in order, an extension of one month was approved.

The appointment of two bearers on Rs. 7 each, from 10th February 1894, in the stock-room, for the purpose of dusting and re-arranging the books, was approved.

March 29th, Ordinary Meeting.

The purchase of certain Persian manuscripts, at prices recommended by Colonel Jarrett, was agreed to.

An exchange of the Society's *Journal*, Part III, for the publications of the Bureau of Ethnology, Smithsonian Institution, Washington, was sanctioned.

On an application from Mr. E. Hartert, it was agreed that the

Proceedings of the Society, in addition to the *Journal*, Part II, already sanctioned, should be supplied in exchange for "Novitates Zoologicae."

On an application from the Under-Secretary to the Government of Bengal, Public Works Department, it was agreed, at a cost of £30, to subscribe for one set of Mr. W. Griggs's proposed portfolios containing photo-collotype reproductions of photographs selected from a valuable collection of negatives at the India Office, illustrating the architecture of India.

The purchase of several books for the Society's library was agreed to.

The exchange of certain coins with Dr. Hoernle was approved.

The payment of Rs. 286 to Mr. L. de Nicéville for drawings in colour of Butterflies for plates I-V, of the Society's *Journal*, Part II, of 1894, was agreed to.

The proceedings of the Philological Committee, regarding the revision of the system of transliteration used by the Society, were read and approved.

Read the correspondence on the subject of the cataloguing the coins of the Society by Mr. C. J. Rodgers of Amritsar. The Secretary's proposal that Mr. Rodgers should be offered five annas a coin for writing and editing a catalogue of the Society's coins was approved. It was ordered that the coins should be sent to Mr. Rodgers in groups, as arranged by Dr. Hoernle,—one group to be returned before another was sent.

With reference to the Council order, dated 1st March 1894, it was determined to retain the services of the assistant in charge of the stock-room for another three months.

The purchase of the manuscript of "Irshadu-z-Zeraat," price Rs. 20, from Bahadur Shah of Lahore, for the Society's library was approved.

Dr. Hoernle, Mr. G. A. Grierson, and Mr. C. Little were deputed to represent the Society at the 10th International Congress of Orientalists at Geneva in 1894.

It was agreed that Mr. A. Pedler should officiate as Treasurer during the absence of Mr. Little.

It was agreed that a third set of the Society's *Asiatic Researches*, *Journal*, and *Proceedings* should be bound for the Library.

April 26th, Ordinary Meeting.

The Librarian of the Wisconsin Academy of Sciences, Arts, and Letters, in reply to his letter offering Volumes III to IX of their "Transactions," and asking for *Journal*, Part I, in exchange, was

informed that the volumes offered in exchange were already in the library, but that Volumes I and II were wanting. It was, therefore, ordered that Volumes LVI to LX of the *Journal*, Part II, should be sent.

A letter from the Secretary, Royal Society of London, on the feasibility of compiling a catalogue of scientific papers through International co-operations, was ordered to be circulated, with the President's remarks, to Council and to the Natural Science Committee.

With reference to an application from the Honorary Secretary and Treasurer, Madras Sanskrit and Vernacular Text Society, soliciting pecuniary aid, it was ordered that one copy each of the *Vaijayantī* of Yādavaprakāṣa (with Sanskrit-English Vocabulary) and Ćākāṭṭyana's Grammar (Sanskrit), with *Prakriāsaṅgraha* Commentary, should be purchased.

A letter from the Under-Secretary to the Government of Bengal, covering copy of a letter from the Government of India, Home Department, conveying sanction to the continuance, up to the end of the financial year 1894-95, of the present arrangement under which search is being carried on for Sanskrit Manuscripts by the Asiatic Society, was recorded.

Permission was granted to Dr. George Watt to copy some of the drawings of the late Dr. A. Barclay's from the Society's *Journal*.

Several books were ordered to be purchased for the Society's library.

The proposal that Dr. Alcock and Dr. Walsh should exchange Secretaryships was agreed to, and the new arrangement was ordered to be reported to the General Meeting.

At the suggestion of Dr. Alcock, *Journal*, Part III, was ordered to be supplied, in addition to *Journal*, Part II, already sanctioned, in exchange for the "Sitzungs-berichte der Gesellschaft Naturforschender Freunde zu Berlin," and an offer was made to exchange back volumes to complete the Society's set.

Read the minutes of the Council on a letter from the Superintendent, Baptist Mission Press, soliciting permission to be allowed to order the next batch of paper for the *Journal* from the Bally Paper Mills. It was resolved that in the printing of the Society's publications, Bally paper, extra quality, might be used at a reduced charge of three annas a page; but that the volumes of the Society's publications at present begun, must be completed with the same sort of paper.

Council resolved that Dr. Hoernle should act for Mr. Grierson as Philological Secretary, and that the appointment should be reported at the General Meeting.

On an application from the Provost of the University of Pennsylvania, an exchange of publications was sanctioned.

The question of repairing the Society's pictures and re-gilding the frames, as recommended by the Sub-Committee, was referred to the Finance Committee for report. If funds were available, the work of cleaning the pictures was ordered to be given to Mr. Palmer with instructions, that in cleaning he should not retouch any part of the picture without reference to the Sub-Committee.

The thanks of the Society were voted to Mr. Hoey for the presentation of a valuable copper-plate inscribed with Açoka characters. The gift was ordered to be reported at the General Meeting.

May 31st, Ordinary Meeting.

The Council accepted the resignation of Dr. Walsh as Anthropological Secretary, and thanked him for his services.

Lord Elgin's acceptance of the office of Patron of the Society was ordered to be reported to the General Meeting.

It was ordered that a reply should be sent to the Royal Society of London, on the feasibility of compiling a catalogue of scientific papers through International co-operation, to the effect that there would be no difficulty in co-ordinating the Society's publications with other periodical publications in English, and that the Society would be prepared to make a moderate contribution to the maintenance of a bureau when the scheme took shape.

On the recommendations of the Physical Science Committee, the offer of Dr. Lawrence Fernandez to present the "Medical Reporter" from 1892 to date, and future issues, to the Society's library was accepted with thanks.

It was agreed, on the recommendation of the Finance Committee, that a sum of money up to a limit of one thousand rupees might, for the present, be spent on repairing the Society's pictures. The question of re-gilding the frames was deferred.

Copies of Wright's Comparative Grammar of the Semitic Languages and of Lacouperie's Western Origin of the Early Chinese Civilization were ordered to be purchased for the Society's library.

June 28th, Ordinary Meeting.

The Honorary Central Secretaries, Indian Medical Congress, in reply to their letter asking the use of the Society's building for the accommodation of some of the sections of the Indian Medical Congress which was to be held in Calcutta from the 24th to 29th December 1894, were informed that the Society would be glad to put its rooms at the

disposal of the Congress, so far as they were not required at the time, for the purposes of the Society.

The Superintendent, Baptist Mission Press, was allowed to charge three annas per page extra for the printing of the *Journal*, *Proceedings*, and *Bibliotheca Indica*, so long as English paper was used.

The Secretary to the Government of India, Revenue and Agricultural Department, in reply to his letter on the subject of the Archaeological Survey Department, was informed that the Asiatic Society of Bengal, would prefer not giving an opinion on such points as concern Bombay and Madras. It was ordered that the papers should be circulated to the Council and to Mr. V. A. Smith, Mr. G. A. Grierson, Mr. W. Hoey, Dr. L. A. Waddell, Dr. A. Führer, and Dr. M. A. Stein.

The resignation of Colonel Jarrett, as a Member of the Council and of the Society, was accepted with regret, and ordered to be announced at the General Meeting.

Council resolved that the services of the Anthropological Assistant, Kumad Bihārī Sāmanta, should be dispensed with for the present.

Permission was given to the Christian Literature Society, Madras, to reprint certain Upaniṣads from the *Bibliotheca Indica* on the same conditions as were granted to the Bombay Theosophical Publication Society.

The supply of Volumes VIII, IX and X of the "Notices" to the Benares Agent for the search for Sanskrit manuscripts was agreed to.

At the suggestion of the Philological Secretary it was agreed that a fee varying from eight annas to one rupee should be paid to the Newari Paṇḍit at the Residency, Nepal, for making copies with translations of some dated Newari inscriptions which had been found in Nepal.

July 26th, Ordinary Meeting.

Messrs. Luzac & Co., in reply to their application for the Agency of the Society, were offered it on the terms previously framed in the case of Messrs. Constable & Co.

The thanks of the Society were voted to Paṇḍit Candra Kānta Tarkālaṅkāra for the presentation of the manuscripts of "Kusumāñjali Vyākhyā," "Tattvāvalī" and "Vaiṣeṣika bhāṣya" to the Society's library.

With reference to an application from the President and Secretary to the Nagri Prachārīnī Sabhā of Benares, to the Government of India, Home Department, praying that the Society would publish a list of such Hindī books as might be found among the Sanskrit books, the Government of India was informed that the Society would be glad to comply with their request.

The minutes of the Council were read on a memorandum by the Treasurer, on the subject of the compulsory conversion of the 4 per cent. loan of 1842-43 and the optional conversion of the other 4 per cent. loans of the Society's investments, in accordance with notification in the *Gazette of India*, dated 30th June 1894. It was ordered that the sum of Rs. 700 now held in the 4 per cent. loan of 1842-43 be converted, but that no steps should be taken with regard to the loans of 1854-55 and 1865.

August 30th, Ordinary Meeting.

A copy of Sir W. W. Hunter's Bengal MS. Records, Volumes I to IV, price 30 shillings, was purchased for the library.

With reference to Mr. H. Beveridge's suggestion on the subject of publishing the translation of "Akbar-Namah," the Philological Committee agreed that a revised and annotated edition of Lieutenant Chalmers' translation of the "Akbar-Namah" should be published. Mr. Beveridge was requested to obtain the formal consent of the Royal Asiatic Society of Great Britain and Ireland to edit the MS. translation of Lieutenant Chalmers which is in their possession, and to transmit their consent to the Society.

Council resolved that the entire investments held in the 4 per cent. loan should be converted into the new $3\frac{1}{2}$ per cent. loan.

September 27th, Ordinary Meeting.

A copy of the portrait of the late Major-General Sir Alexander Cunningham was purchased for the Society.

The offer of Mr. J. G. Delmerick of a copy of the manuscript of "Tarikh-Muzaffari" in exchange for Vols. II and III of Colonel Jarrett's translation of the "Ain-i-Akbari," Major Raverty's "Tabaqat-i-Nasiri" and translation of "Badouni," was approved.

Paṇḍit Harimohan Vidyābhūṣaṇa, the Paṇḍit of the Society, was granted leave for one month owing to ill-health; and as his substitute, Paṇḍit Annadāprasād Sarasvatī was accepted.

November 1st, Ordinary Meeting.

On an application from the Academy of Natural Sciences, Philadelphia, it was ordered that, as far as possible, the Society's publications wanting in their set should be supplied.

Several books were ordered to be purchased for the Society's library.

The acceptance of Messrs. Luzac and Co. of the Agency of the Society on the terms offered to them was recorded.

November 29th, Ordinary Meeting.

Permission was given to Dr. Friedrich Schwally to borrow the Arabic manuscript "Kitabul' Mahasinwal Masawi," from the Society's library, on the guarantee of the University of Strassburg.

On an application from the Secretary, Koninklijk Instituut voor de Taal-Land-En Volkenkunde van Nederlandsch-Indië, it was agreed that *Journal*, Parts I and II, should be sent in exchange for their "Bijdragen." The Society's publications for the last ten years were ordered to be supplied.

It was resolved that Mr. Lyall should be asked to continue to hold the office of President of the Society till February, when the term of his office expires.

In consequence of the request of the Natural History Secretary for a special grant of £68-11-0 to meet the bill from Messrs. West, Newman, & Co. for the five Chromo-Lithograph plates of butterflies, issued in the *Journal*, Part II, No. 3 of 1894, it was resolved that in future no more than the third of the annual budget grant should be spent on plates; and that for the 1894 *Journal*, Part II will consist of the three numbers already published.

The Secretary was directed to forward the report of the Philological Secretary on the subject of the conservation of Sanskrit manuscripts to the Government of India, and to represent the desirability of continuing the grant for a further period of 5 years.

It was ordered that two copies of Dr. Grierson's *Modern Vernacular Literature of Hindustan* be lent to the Society's agents for the search of Sanskrit manuscripts from the reserve copies in stock.

The purchase of several books for the Society's library was sanctioned.

December 28th, Ordinary Meeting.

Permission was given to Dr. Bruno Liebech to borrow the manuscript of the "Candra Vyākaraṇa" from the Society's library on the guarantee of the University of Breslau.

In continuation of the Council order of the 28th June, it was agreed that a reply should be sent to the Government of India, to the effect that the Society was not in a position to assume control of the Archaeological Survey in Bengal, and that it recommended the adoption of the Lieutenant-Governor's proposal to appoint an Archaeological Officer under the Bengal Government.

The Report having been read, the Chairman invited the meeting to put any questions, or to offer any remarks, which any member might think necessary in connection therewith.

No remarks having been offered, the Chairman moved the adoption of the Report. The motion was unanimously carried.

The CHAIRMAN then read the Report of the Trustees of the "Elliott Prize for Scientific Research."

Report on the "Elliott Prize for Scientific Research."

The subject selected for the Prize in 1894 was Natural History. The Trustees have received one Essay in that subject; but it has been decided, after consulting experts as provided in the scheme, that the Essay sent in is not of sufficient merit to justify the award of the Prize.

For the Trustees,

A. CROFT,

Vice-Chancellor of the Calcutta University,

and Director of Public Instruction, Bengal.

Calcutta, the 30th January 1895.

The CHAIRMAN announced that the Scrutineers reported the result of the Election of Officers and Members of Council to be as follows:—

President :

A Pedler, Esq., F.R.S.

Vice-Presidents :

Sir A. W. Croft, M.A., K.C.I.E.

The Hon. Sir C. A. Elliott, K.C.S.I., C.I.E.

Colonel J. Waterhouse, B.S.C.

Secretaries and Treasurer :

Dr. G. A. Grierson, C.S., C.I.E.

Dr. A. W. Alcock, C.M.Z.S.

C. R. Wilson, Esq., M.A.

Paṇḍit Haraprasād Çāstrí, M.A.

C. Little, Esq., M.A.

Other Members of Council :

Dr. A. F. R. Hoernle.

Mahāmahopādhyāya Maheṣa Candra Nyāyaratna, C.I.E.

J. Mann, Esq., M.A.

Bābu Pratāpa Candra Ghoṣa, B.A.

Dr. D. D. Cunningham, F.R.S., C.I.E.

Shams-ul-ulama Moulvie Ahmud.

C. L. Griesbach, Esq., C.I.E., F.G.S.

Dr. G. Ranking.

The meeting was then resolved into the Ordinary General Meeting.

A. Pedler, Esq., F.R.S., PRESIDENT, in the Chair.

The CHAIRMAN before taking his seat said : “ Before proceeding to the business of the Ordinary General Meeting, I have to express my sense of the great honour which this Meeting has conferred upon me, in electing me to the office of President of this Society. When I was asked by the Council to allow my name to be put forward, I felt considerable diffidence in consenting to the request, for I am much afraid I shall not be able to do full justice to the traditions of the responsible post of President, a post which has been held previously by so many distinguished men. I can only hope that during the tenure of my office the prosperity of the Society will not in any way be diminished. I am sure I cannot make a better use of my position, in the first instance, than by asking the Meeting to express their thanks to the late President, Vice-Presidents, Secretaries, and Council, for the time and care which they have bestowed on the affairs of the Society during the past year. Only one who has served as an officer of the Society can fully appreciate the labour and responsibility which falls upon the Secretaries, charged as they are with editing its publications. From personal experience I can say that it means about two hours daily work—work which cannot be overlooked or delegated to others. I, therefore, propose a vote of cordial thanks to the Council and Secretaries of the year 1894.”

(The vote of thanks was carried unanimously.)

The minutes of the last meeting were read and confirmed.

Thirty-four presentations were announced, details of which are given in the Library List appended.

The following gentlemen are candidates for election at the next Meeting :—

A. F. M. Abdur Rahman, Esq., Barrister-at-Law (for re-Election) ; proposed by Dr. A. F. R. Hoernle, seconded by C. R. Wilson, Esq.

P. C. Rāya, Esq., D. Sc., Edin ; proposed by A. Pedler, Esq., seconded by C. Little, Esq.

Bābu Rājeçvara Mitra, P. W. D., Raipur, C. P. ; proposed by P. N. Bose, Esq., seconded by R. C. Dutt, Esq.

J. C. Bose, Esq. B. Sc. ; proposed by A. Pedler, Esq., seconded by C. Little, Esq.

The SECRETARY reported the death of the following corresponding member :—

A. Von Krämer, Esq., Alexandria.

The PRESIDENT read the following letter:—

No. $\frac{206}{6}$.

FROM

E. D. MACLAGAN, Esq., C. S.,

Under-Secretary to the Government of India,

TO

THE HONORARY SECRETARY,

Asiatic Society of Bengal.

Department of Revenue

and Agriculture.

(Arch. & Epi.)

Calcutta, the 21st January, 1895.

SIR,

In acknowledging the receipt of your letter, No. K-7, dated the 5th instant, I am directed to convey the thanks of the Government of India to the Asiatic Society of Bengal for the care with which it has considered the questions referred to it regarding the work of the Archaeological Survey of India, and for the full expression of its opinion contained in your letter, which will materially assist the Government of India in the disposal of the subject.

I have the honour to be,

SIR,

Your most obedient Servant,

E. D. MACLAGAN,

Under-Secretary,

The PRESIDENT also read a letter from the Hon. Mahārāja Pratāp Narain Singh, forwarding certain Sanskrit books published by him, as a presentation to the Society's Library.

The PRESIDENT laid on the table the Budget of expenses on the *Bibliotheca Indica* for 1895, drawn up by the Philological Committee and approved by the Council.

PROCEEDINGS OF A MEETING OF THE PHILOLOGICAL COMMITTEE OF THE ASIATIC SOCIETY OF BENGAL.

Held on Friday, February 1st, 1895.

PRESENT :

Mahāmahopādhyāya Maheṣa Candra Nyāyaraṭna.

G. A. Grierson, Esq., Ph.D., C.I.E., *Hon. Phil. Secy.*

Paṇḍit Haraprasād Ḍāstri.

Dr. A. F. Rudolf Hoernle.

Major R. Temple, C.I.E.

C. R. Wilson, Esq.

We recommend that the following Budget for the "Bibliotheca Indica" for the year 1895 be approved :—

BUDGET ESTIMATE FOR 1895.

RECEIPTS.	RS.	AS.	P.	DISBURSEMENTS.	RS.	AS.	P.
Balance in hand ...	8,300	0	0	Tattva-cintāmaṇi ...	600	0	0
Government grant for 1895	9,000	0	0	Svayambhū-purāṇa ...	1,050	0	0
	17,300	0	0	Tul'sī-sat'saī ...	300	0	0
				Brhad-dharma-purāṇa ..	600	0	0
				Pag-Sam-Thi-S'in ...	500	0	0
				Mārkaṇḍēya-purāṇa ..	600	0	0
				Nyāya-vārttikā ...	900	0	0
				Kalpalatā ...	1,350	0	0
				Caturvarga-cintāmaṇi ...	600	0	0
				Taittirīya-saṁhitā ...	600	0	0
				Çrauta-sūtra of Çāṁkhāyana	700	0	0
				Nyāyakusumāñjali ...	300	0	0
				Ma'āşiru-l-Umarā ...	400	0	0
				Aitarēya-brāhmaṇa ...	2,400	0	0
				Muntakhabu-t-tawāriḥ	600	0	0
				Sher Phyin ...	1,600	0	0
				Translation of the Akbarnāma	600	0	0
				Ātharvaṇa-upaniṣads ...	300	0	0
				Smṛti-candrikā ...	600	0	0
				Kāla-vivēka ...	600	0	0
				Uttarādhyayana-sūtra or Nāta-			
				dhamma-kathā-sūta as may			
				be arranged ...	300	0	0
				Āpastamba-çrauta-sūtra ...	350	0	0
				Sāṁkhya-pravacana-bhāṣya ..	600	0	0
				Padmāvai ...	300	0	0
				Aṇubhāṣya ...	300	0	0
					17,050	0	0

Note—

No account has been taken of the sale proceeds of books, as they cover the establishment, postage, and other charges.

The *Smṛti-candrikā* and *Kāla-vivēka* are new issues in the series, and should only be published, if ancient MSS. are available to the satisfaction of the Philological Committee.

The *Caturvarga-cintāmaṇi* should not be continued, unless the editors can satisfy the Philological Committee that suitable MSS. are available.

We recommend that *Çribhāṣya* be removed from the list, as a good edition has been published in Benares.

The following books have been stopped for various reasons :—

Lalita-vistara (English Translation).

Suçruta.

The following list of works sanctioned and approved by the Council, but not taken in hand, has been drawn up in order of urgency :—

- | | |
|---------------------------------|----------------------------------|
| 1. Hiranya-kēçī-sūtra (Çrauta). | 5. Tawāriḥ-i-Yamīnī. |
| 2. Baudhāyana-sūtra (Çrauta). | 6. Tawāriḥ-i-Wassāf. |
| 3. Vipāka-sūtra. | 7. Tāju-l-Ma'āşir. |
| 4. Saddharma-puṇḍarikā. | 8. Naqa'idu-l-farazdaq wa Jarir. |

- | | |
|--|-----------------------|
| 9. Karaṇa-grantha. | 11. Yājñavalkya-gītā. |
| 10. Bhaṭṭōtpala's Commentary
on the Br̥hat-saṃhitā. | 12. Caraka. |

The PRESIDENT announced that Dr. G. A. Grierson had returned from leave and had taken charge of the Philological Secretaryship from Dr. A. F. R. Hoernle.

The Philological Secretary read the following correspondence regarding Mr. Irvine's article on *Guru Gōbind Singh and Bandah*, which appeared in the *Journal*, Vol. LXIII, Part I, pp. 110 and ff.

AMRITSAR,
19th November 1894.

(1) Letter from Mr. Rodgers to Mr. Irvine.

MY DEAR SIR,

I have read the paper you wrote on Gōbind Singh and Bandah with much interest. I have not the authorities you use, so do not know the contents of any of the books.

I noted some slight inaccuracies which I am going to point out to you, simply because I like all works on the Punjab to be accurate.

Journal, p. 129. Amritsar is 32 miles almost due east of Lahore, not 40 miles north of the capital.

Page 133. Sadhaura is not on a steep hill. The banks of the *nadī* are just a little elevated. Page 122. The name of the *faqīr* whose tomb is there to this day, is شاه قیسی not فیض. I spent a week there when Archæological Surveyor. General Cunningham's description (*Rep. Arch. Survey* xiv., 72) of it is full of errors. You did not use him. The country round is flat but intersected with river beds. I heard nothing then of Lōhgarh.

Page 134. No coins were struck at Lōhgarh. I have made enquiries and no one ever heard of such coins. They were struck at Anandgarh (spelt on the rupees انند گهره). This is Anandpūr I believe of the present day.

The couplet you give, as having been on these coins, I have never seen. There is one with سیم و زر in it. The couplet is variously given. In my paper I made a shot at it. I examined thousands of Sikh rupees for my paper. Since I wrote it I have come across Pind Dādan Khān rupees with mint name نمک 'salt,' on them, for Pind Dādan Khān. I have also got a دیره rupee. In copper I have also seen some novelties, notably some coins bearing the name of Dalip Singh.

As I am always searching for novelties in Sikh coins and must see some thousands every year, I do not think it possible that any coins were here struck by Banda.

The earliest Sikh coins in existence are the rupees of Lahore, struck in 1822, *Samvat*, or 1765 A.D. But you may have some authority for your statement which I have not seen. I distrust all native authorities on coins, as they write without seeing a rupee or mohar.

Page 123. I notice also that the position of Banūr is given as some ten to twelve miles north-east of Sirhind. It is E. by S. of Sirhind, about 20 miles.

I have been all over this part of the Punjab, and at Banūr, Sirhind, and Sadhaura (not Sādhaura).

I am,

Yours sincerely,

C. J. RODGERS.

(2) Mr. Irvine's reply.

MY DEAR RODGERS,

12th December 1894.

I am very much obliged, indeed, to you for your letter of the 19th November. Such comments founded on local knowledge are quite invaluable. My own endeavour is to secure absolute accuracy, but, as I daresay you know by experience, it is almost impossible to attain it. I have no personal knowledge of the Punjab, and have to depend on others, on books, and on maps, and I need hardly tell you what hard work it is to identify the names of men, or the situation of places. I was introduced to one of the *faqīr* family at Lahore, a retired Extra Assistant Commissioner, and he wrote once giving me help in Lahore topography, but he did not continue as he began, for he never answered my second letter, and I have heard that he died not long ago. I wish I had thought of you. I have still a lot of matter into which Lahore and the Punjab enter. If I ever address you a question or two, I hope you will not think it too great a trespass on your time. I will just make a remark or two on the points you raise.

First—AS TO THE TOPOGRAPHY. The truth is, I left this for revision, from end to end of my work until I had finished; intending when I printed (alas! *when?*) to use the Imperial Gazetteer, the Indian Atlas, Cunningham, and the Provincial Gazetteer, as I thought if I took up the subject separately I should be less likely to overlook anything. When I wrote out this extract for the Press, I worked up the geography piece-meal, and did not give it a final revision.

Amritsar.—Distances taken by measurement from a small-scale map are likely to be out. That is how I got 40 miles instead of 32

miles. How I got N. instead of E. I do not know, unless it was by trusting to that treacherous thing, memory. There is a little N. in the direction, though, is there not?

Sadhaurah.—G. Forster, who passed through it, says: “A village on a high hill of steep ascent (I. 235);” so you see that you may go wrong even in copying from an eye-witness. As all my authorities spell *سادھورا* I think I was right in putting Sādhaurah, but I notice Forster has Sudhowra, which represents I suppose a short *a*. I will put, in a note, the modern pronunciation on your authority. I find I first had Shāh Qamīn قمین, but finding Faiz فیض in the printed text of the *Ma‘āshir-ul-umarā* (I. 830) I assumed that the Native (Calcutta) Editor, being himself a Mahomedan, knew the correct name of the Saint, so I rejected the previous reading taken from the *Mirāt-i-Wāridāt*. I will get out Cunningham, and note what he says about Sadhaurah.

Banūr.—I will correct this.

Second—COINS. That you have never seen a coin of Bandah’s is of course a presumption,—a strong presumption one may even say—that no such coin ever existed. But to use the legal distinction, there is a difference between evidence and proof. Even if no such coin now exists anywhere on the face of this globe, that is not *proof* that no such coin ever did exist. And in this instance, I see no sufficient reason for rejecting the statement which I have found in my authority. My authorities for this Sikh episode in 1710 are, (1) Kāmwar Khān, (2) Wārid, (3) Mīrzā Muḥammad, (4) Muḥammad Iḥsān Ījād. I do not know when the first was born or when he died (his death must have been after 1137 H.), but he was alive in 1710 and present at Sadhaurah and Lōhgarh, being then Mīrsāmān, or Chamberlain, to Rafi‘u-sh-Shān, the third son of Bahādur Shāh. Wārid was one Muḥammad Shafī‘, born at Nadīnah, or Nagīnah (now in the Bijnōr District) in 1087 H. He professes to recollect what happened from 1100, and he went on writing up to 1152 H. When he died I do not know. He lived at Delhi from about 1124 H. under the protection of Bairam Khān, a noble of good descent. Mīrzā Muḥammad was born in 1098 H., was alive in 1152 H., and probably did not die till after 1163 H. He also was in Bahādur Shāh’s camp at Sadhaurah in 1122.—But the statement as to the coin rests on the fourth authority, that of the *Farrukh Shāh Nāmah* of Muḥammad Iḥsān Ījād. The following are the reasons why I accept him:—

1. He was a contemporary.

2. He wrote very near the time—he mentions corrections made by Farrukhsīyar in the events of 1129 H. Farrukhsīyar was killed in 1131 H., so the corrections took place before that year; and as the events of 1129 H. had been recorded, it is to be presumed that the

earlier passage, where the Sikh coin is spoken of, was in existence then, and had been already written. Ījād himself died in 1133—so says Ghulām ‘Alī Arād (*Khīrānah-i-‘Amīrah*, litho. text, p. 28). His work was therefore in existence at the most within 11, probably within 6 or 7 years after 1122 H., the year when Bandah first rose.

3. Ījād was a native of Samānah, Sirkār Sirhind, and therefore likely to be specially interested on the Sikh rising, and to have friends to supply him with information.

4. He was the official historiographer, and as such, supplied with all the official reports (*Wāqi‘ahs*) and news letters (*Sawānihs*).

5. The statement as to the coin is not in itself improbable, and I see no object to be gained in inventing such a statement.

You will note that the word Lōhgarh is not said to have been on the coin. Perhaps, if you looked again through your coins, you might find one with “*Zarb ba Amanu-d-dahr, Maswarat-shahr.*”

I have never seen *Namak* used as the name of a place, though apparently *Namak sār* was—it was the name of the salt mines.

I have not knowingly shirked any difficulty, but have rather made it my object to bring out details and localize as much as possible. As to Sadhaurah, it was quite easy to evade being wrong by saying, “the tomb of a Saint having some local repute;” but I prefer to be precise, although I thereby run the risk of an inaccuracy. Again thanking you,

I am,

Yours very truly,

WM. IRVINE.

Extract from Letter from Mr. Rodgers to the Philological Secretary.

AMRITSAR,

20th January 1895.

MY DEAR SIR,

Sikhism and the coinage of the Sikhs have been pet studies of mine. On reading Mr. Irvine’s paper I went into the city to enquire about these Lōhgarh rupees that he mentions. Not one of the money-changers here had ever heard of them. I have never seen one. I travelled over the whole of the eastern part of the Amballa district, and I searched for coins in every bazaar. I see thousands of Sikh rupees every year, but as yet no Lōhgarh rupee has been seen by me.

The fact, however, that I have not seen one, is no argument for their non-existence. Just lately I have come across—

(1.) A new type of rupee of Quṭbu-d-Dīn Mubārak Shāh, struck at Dāru-l-Islām, 717 H.

(2.) A rupee of Rafi'ū-d-Darajāt, with the word دادگر instead of بحرور.

(3.) A gold mōhar of Zainu-l-Ābidīn, of Kashmīr, dated 851. This is in lovely preservation, and is the only one known.

(4.) A dām of Akbar's, struck at Kālānaur, the place where he was crowned.

(5.) A half-dām of Ibrāhīm Sūr,—the only one known.

I never expected to find any one of these coins. So it may happen that some day I may come across a rupee of Lōhgarh.

You are at liberty to print my letter to Mr. Irvine, and to use as much of this as you like.

I am,

Yours sincerely,

CHAS. J. RODGERS.

The GENERAL SECRETARY read a letter from Mohanto Omrao Giri Gossain asking for the return of the two Tibetan MSS. entitled "Lam Rim Chhen-po" and "Rdorje Hehhaû Chhenpohi Lam Gyi Rim-pa," the presentation of which was announced in the Society's Proceedings for January 1892, and announced that the Council had accordingly ordered the MSS. to be returned.

The HON. SIR C. A. ELLIOTT, VICE-PRESIDENT, exhibited a copy of the Tibetan block-print volume entitled "DoKalzung."

BĀBU ÇARAT CANDRA DĀS read the following note on the above:—

In examining the Tibetan manuscripts and xylographs contained in the Asiatic Society's Library, I have found a very old manuscript volume of "Dokalzung." Its leaves are almost all worm-eaten with the exception of the title-page, which is in a fair state of preservation. The title-page begins with two ornamental letters, called "yig-go," or the auspicious head letters, followed by two perpendicular strokes meaning full points. Then in Tibetan character is written the following:—"Rgyā-gar škad-du Āryā Bhadra Kalpikānāma Mahāyāna Sūtra." In the language of India, the sacred Mahāyāna aphorism, called the "Glorious Age." The text of this manuscript volume is full of mistakes. The block-print volume belonging to the Hon'ble Sir Charles Elliott is a correct edition. It is probably one of the earliest impressions taken from the stereotyped wooden boards that were prepared in 1726 A.D., under the orders of King Miwang. Since then no other edition of this work has appeared in Tibet. When I visited the great Printing Establishment of Narthang, near Tashilhumpo, in 1879, I found that the engraving on the wooden blocks of the *Kahgyur* had almost become worn out. Recent impressions from them must, therefore,

be very indistinct. “Dokalzang” is considered holiest among the 108 volumes of the *Kahgyur* collection, on account of its containing the names of 1,005 Buddhas of the present *Kalpa*, a forecast of future Buddhism and its power for leading humanity to the state of *Bodhi*, or Enlightenment. There is a small picture at each end of the title-page. [See Plate No. I.] One of them is Buddha Çākya Muni with a disc of Saint’s glory of blue light round his head, and the other is Maitreya, the coming Buddha. On the back of these two figures of Buddhas there are two rainbows shewing their celestial position. An equal number of disciples and followers attend them both. In the picture of Çākya Muni his two disciples, Çāriputra and Maud Galyāyana, are offering him food from their alms-bowls. Ānanda, his personal attendant, is waiting for orders, and Subhuti is standing in a devotional mood to note down whatever may drop from his lips in the way of instruction. An Indian king with his wife and child sits on the floor at the foot of Buddha’s seat, in anxious expectation of hearing his sermons. The child is looking to the father for wisdom who is dressed in blue typifying worldliness. The Tibetan artist having no idea of the dress of an Indian *Rāni* has made the queen look like the wife of a Dōkpa chieftain of Northern Tibet. In the picture of Maitreya, his disciples are offering him burnt incense, and a basket full of gems, gold and silver. A Tibetan highlander, sitting on his knees, with his wife and child, is offering him a large blue gem, called Indra Nila. The child is looking to his mother in love for love. The father is dressed in yellow shewing more of religion. The coming Buddha Maitreya—the personification of love—will bring the Mahāyāna Buddhism to perfection. He can, therefore, accept gold and silver. Buddha Çākya Muni was an ascetic, and called *Mahā Çramana* of the highest order, he having absolutely renounced the world, and preached the Çrāvaka doctrine of perfect poverty, and not touch gold, silver, &c. In some pictures and wood engravings of Tibet, Maitreya, the coming Buddha, is seated on a chair—a posture which is evidently foreign to India. As the Mahāyāna School of Buddhism obtained its highest development in the Bactrian Empire of the Greeks, which included in it Kashmir, Cabul, Kandahar, Herat, and the valley of the Oxus, &c., it is probable that from there the Light of the East was transmitted Westward, or that Christianity was foreshadowed in Sanskrit Buddhist works. The similarity of Christianity to Mahāyāna Buddhism is striking and Maitreya, the coming Messiah of the Buddhists, who is now the Regent of the Lord in Heaven, called Tuṣhita, will come to this Earth to make all mankind blessed and glorious.

The two pictures represent the two stages in the spiritual progress of Humanity. The first picture shows a condition of progressive self-

control; the process of self-purification is still at so early a stage that the external conditions of the individual have to be carefully adjusted to his weak condition. He is an ascetic, denies himself abundance of food, he inhabits the woods, and carefully and scrupulously lives a life away from the haunts of men; thus he flies from temptations because temptations may overcome him. So in primitive Humanity the conditions of life are simple. The second picture typifies a higher state of self-control and inner development. The previous discipline has borne fruit, and the ascetic no longer requires to live in the woods or monasteries. At the time of Buddha, or of Christ, a new era was inaugurated when the children of God "*live in the world though not of it.*" Surrounded by temptations of every kind the present and future ascetic maintains his firm hold upon the inner life, unmoved and without attachment. Thus the two pictures show forth the law of evolution as it affects and powerfully modifies the growth of character and development of religion itself, or of the Human capacity to receive spiritual revelations.

The following papers were read :—

1. *Description of a new Lathraea from the Eastern Himalaya*,—By SURGEON-CAPTAIN H. A. CUMMINS, *Army Medical Staff*. Communicated by the NATURAL HISTORY SECRETARY (*Postponed from last Meeting.*)

2. *Notes on the bleaching action of light on colouring matters*,—By ALEXANDER PEDLER, ESQ., F.R.S., &c.

The papers will be published in the *Journal*, Part II.

3. *On changes in the course of the Kusi River, and the probable dangers arising from them*,—By F. A. SHILLINGFORD, ESQ.

The paper will be published in the *Journal*, Part I.

Sir Charles Elliott said :—"The paper, as far as it has been explained to us by Dr. Grierson, is open to criticism on many points. The past history of the Kusi river is uncertain. It is admitted that it originally flowed in an easterly course, and has gradually reached its present position where it flows almost direct south from the gorge through which it debouches from the Himalayas. But why should not the swing of the pendulum continue till it is deflected as much to the west as it ever was to the east? There seems to be no evidence adduced to show that, the river has reached its westernmost position, or to show that if it has, it will return violently from a direct southern to an extreme eastern course, instead of doing so gradually. Neither has anything been said about the well-known theory of the westering of rivers in the Northern Hemisphere which, so far as it is a true theory, would lead us to expect the river to trend in a westerly, not an

easterly direction. However, the course of the Kusi river has been receiving the attention of Government and of the Public Works Department, and I wish that the Secretary, Mr. Odling, had been here this evening to give the meeting the benefit of his knowledge and experience. A special engineer was deputed during the past rainy season to study the river. His investigation is at present incomplete. The river Kusi commences to spill at Bedrà in Nepaul. No material change is reported to have occurred in its course since the year 1889, when the main stream came over from the western side of the river, a little north of the place mentioned. The stream, at present, is on the eastern side of the bed, and there are no indications of any immediate change. Some caution is necessary in expressing an opinion as to the future, as it is commonly said that the only certain theory about the river Kusi is that it will behave in a way totally different from what has been predicted. There is a heavy spill on the eastern bank of the river which does considerable damage, large areas of land, mostly however in Nepaulese territory, having been thrown out of cultivation during the last five years. It seems that it is mainly the land owners in the district who are apprehensive; the railway engineers entertain no fears on the subject. Still if any measures could be suggested which would commend themselves to experts as undoubtedly tending to secure the district of Purneah against the possible vagaries of the river at a reasonable expense, the Government would be glad to do what it could. It is hardly necessary to say that, as in all similar cases, the objects of the promoters of embankment schemes are, in themselves, so good, that it is impossible not to sympathize with them. The advantages resulting from an embankment are usually immediate and obvious. But there is scarcely a case, in Bengal at least, where it has not happened that in the course of years the difficulties and not unfrequently dangers caused by embankments have become so great that their removal has become a question of discussion. In the case of the Damoodah and Goomti rivers this step became a pressing necessity and has been carried out. At the same time it must be remembered that changes in the course of a river arise from the most trivial causes, such as the occurrence of a snag in the stream, or its meeting a slightly harder bed of clay or *kunkar*."

4. *Çrī Dharma Mangala* :—a distant echo of the *Lalita Vistara*,—By
PANDIT HARAPRASĀD ÇĀSTRĪ, M.A.

The paper will be published in the *Journal*, Part I.

LIBRARY.

The following additions have been made to the Library since the Meeting held in January last:—

TRANSACTIONS, PROCEEDINGS, AND JOURNALS,

presented by the respective Societies and Editors.

Batavia. Bataviaasch Genootschap van Kunsten en Wetenschappen,—
Tijdschrift voor Indische Taal,-Land-en Volkenkunde, Deel
XXXVIII, Afl. 3.

———. ———. Verhandelingen. Deel XLVII.

Birmingham. Birmingham Natural History and Philosophical So-
ciety,—Proceedings; Vol. IX, Part 1.

Bombay. Bombay Natural History Society,—Journal, Vol. IX, No. 2.

———. The Indian Antiquary,—December 1894 and January 1895.

Budapest. La Société Hongroise de Géographie,—Bulletin, Tome
XXII, Nos. 1-5.

Calcutta. Indian Engineering,—Vol, XVII, Nos. 1-5.

———. Maha-bodhi Society,—Journal, Vol. III, No. 9.

———. The Medical Reporter,—Vol, V, No. 2.

———. Photographic Society of India,—Journal, Vol. VIII, Nos. 1
and 2.

Chicago, Ill. The American Antiquarian and Oriental Journal,—[Vol.
XVI, No. 6.

Dublin. Royal Irish Academy,—Proceedings, Vol. III (3rd Series),
No. 3.

Florence. Società Africana D'Italia,—Bullettino, Tome II, Nos. 3
et 4.

The Hague. Koninklijk Instituut voor de Taal,—Land-en Volken-
kunde van Nederlandsch-Indië,—Bijdragen tot de Taal,—Land-en
Volkenkunde van Nederlandsch-Indië, Band I (6^e Volgr.), Nr. 1.

Leipzig. Der Königlich Sächsischen Gesellschaft der Wissenschaften
zu Leipzig,—Berichte über die Verhandlungen, Math.-Phys.
classe, II, 1894.

London. The Academy,—Nos. 1181-85.

———. The Athenæum,—Nos. 3504-3508.

———. Nature,—Vols. L, Nos. 1300; LI, 1312-16.

———. Royal Asiatic Society of Great Britain and Ireland,—Journal,
January 1895.

———. Royal Astronomical Society,—Monthly Notices, Vol. LV,
Nos. 1 and 2.

- London. Royal Geographical Society,—Geographical Journal, Vol. V No. 1.
- . Royal Microscopical Society,—Journal, Part 5, 1894.
- . Royal Society,—Proceedings, Vol. LVI, Nos. 337 and 339.
- Manchester. Manchester Literary and Philosophical Society,—Memoirs and Proceedings, Vols. VIII (4th series), Nos. 4; IX, 1.
- Moscow. La Société Impériale des Naturalistes de Moscou,—Bulletin, No. 2, 1894.
- Mussoorie. The Indian Forester,—Vols. XX, Nos. 12; XXI, 1.
- Paris. Journal Asiatique,—Tome IV (IX^e série), No. 1.
- . Société de Géographie,—Bulletin, No. 3, 1894.
- . ———. Comptes Rendus des Séances, Nos. 17-19, 1894.
- . Société Philomatheque de Paris,—Comptes Rendus Sommaire des Séances, Nos. 4 et 5, 1894.
- Philadelphia. American Academy of Political and Social Science,—Annals, Vol. V, No. 4.
- St. Petersburg. L'Académie Impériale des Sciences de St. Pétersbourg,—Bulletin, Tome I (V^e série), Nos. 1 et 4.
- . Comité Géologique,—Bulletins, Tome XII, Nos. 8-9; XIII, 1-3.
- . ———. Mémoires, Tome VIII, Nos. 2-3; IX, 3.
- . Imperial Russian Geographical Society,—Proceedings, Vol. XXX, No. 4.
- Stockholm. Kongl. Svenska Vetenskaps,—Akademiens,—Accessions—Katalog, VIII, 1893.
- . ———. Bihang, Band XIX, Afdelning, 1-4.
- . ———. Lefnadsteckningar, Band III, Häfte 2,
- . Société Entomologique à Stockholm,—Journal Entomologique, Tome XV, Nos. 1-4.
- Sydney. Linnean Society of New South Wales,—Proceedings, Vol. IX (2nd Series), Part 2.
- Taiping. Perak Government,—Gazette, Vols. VII, Nos. 29-31; VIII, 1-2.
- Tōkyō. Imperial University,—Journal of the College of Science, Vol. VII, Parts 2 and 3.
- Washington. United States Geological Survey,—Bulletin. Nos 97-117.

BOOKS AND PAMPHLETS,

presented by the Authors, Translators, &c.

- BLANFORD, W. T. A note on Birds from Central India in Barnes's Handbook. 8vo. Bombay, 1894.

GRIERSON, DR. G. A. The Bhasha-Bhushana of Jas'want Singh. 4to. Bombay, 1894.

HÆCKEL, ERNST. Monism as connecting Religion and Science, translated from the German, by J. Gilchrist. 8vo. London, 1894.

RĀY, PRATĀPA CHANDRA. The Mahabharata, translated into English prose, Part 93. 8vo. Calcutta, 1894.

MISCELLANEOUS PRESENTATIONS.

Ara: a Journal of Literature and of Armenian Politics and History, Vol. IV, No. 1. 8vo. Dacca, 1885.

J. D. MELIK BEGLAR, ESQ.

Returns of the Rail-borne Traffic of the Central Provinces during the quarter ending 30th September 1894. Fcp. Nagpur, 1894.

CHIEF COMMISSIONER, CENTRAL PROVINCES.

DENIFLE, HENRICUS; et CHATELAIN, ÆMILIO. Chartularium Universitatis Parisiensis, Tomus III. 4to. Paris, 1894.

FRENCH GOVERNMENT.

Report on the Administration of the Government of Bengal, 1193-94. Fcp. Calcutta, 1894.

RISLEY, H. H. The Gazetteer of Sikhim. 4to. Calcutta, 1894.

GOVERNMENT OF BENGAL.

Progress Report of the Archæological Survey of Western India for the months, May 1893 to April 1894. Fcp. Bombay, 1894.

GOVERNMENT OF BOMBAY.

Indian Antiquary from November to December 1894, and January 1895. Bombay, 1894-95.

North Indian Notes and Queries for September and October 1894. 4to. Allahabad, 1894.

GOVERNMENT OF INDIA, HOME DEPARTMENT.

Epigraphia Indica of the Archæological Survey of India, Vol. II, Part 16. Fcp. Calcutta, 1894.

GOVERNMENT OF INDIA, REV. AND AGRI. DEPT.

Manual of the Administration of the Madras Presidency, Vol. III. Glossary. Fcp. Madras, 1893.

GOVERNMENT OF MADRAS.

A Guide to the Zoological collections exhibited in the Reptile and Amphibia Gallery of the Indian Museum. 8vo. Calcutta, 1894.

INDIAN MUSEUM.

ELIOT, J. Instructions to Observers of the Indian Meteorological Department. 8vo. Calcutta, 1894.

Indian Meteorological Memoirs, Vol. V, Part 6. Fcp. Calcutta, 1894.

METEOROLOGICAL REPORTER TO THE GOVERNMENT OF INDIA. *

Bulletin of the Microscopical Society of Calcutta for November 1894.
8vo. Calcutta, 1894.

Seventh Report of the Microscopical Society of Calcutta for the year
1894. 8vo. Calcutta, 1895.

MICROSCOPICAL SOCIETY OF CALCUTTA.

Anales del Museo Nacional de Montevideo, II. 4to. Montevideo, 1894.

MUSEO NACIONAL DE MONTEVIDEO.

Annual Report of the Sanitary Commissioner with the Government of
India, 1893. Fcp. Calcutta, 1894.

SANITARY COMMISSIONER WITH THE GOVERNMENT OF INDIA.

DAY, DAVID T. Mineral Resources of the United States for 1892 and
1893. 8vo. Washington, 1893-94.

Annual Report of the United States Geological Survey, 1890-91, Parts
I-II; 1891-92, Parts I-III. 4to. Washington, 1891-93.

Monographs of the United States Geological Survey, XIX, XXI and
XXII. 4to. Washington, 1892-93.

UNITED STATES GEOLOGICAL SURVEY, WASHINGTON.

PERIODICALS PURCHASED.

Allahabad. North Indian Notes and Queries,—Vol. IV, No. 7.

Berlin. Deutsche Litteraturzeitung,—Band XV, Nrn. 40-48.

———. Zeitschrift für Ethnologie,—Heft V, 1894.

Calcutta. Botanisches Centralblatt,—Band LIX, Nrn. 13; LX, 1-10.

———. The Calcutta Review,—January 1895.

———. Indian Medical Gazette,—Vol. XXX, No. 1.

Geneva. Archives des Sciences Physiques et Naturelles,—Tome XXXII,
Nos. 10 and 12.

Göttingen. Der Königl. Gesellschaft der Wissenschaften,—Götting-
ische gelehrte Anzeigen, Nrn. 10 und 11, 1894.

———. ———. Nachrichten, Nr. 3, 1894.

Leipzig. Annalen der Physik und Chemie,—Band LIV, Heft 1.

London. The Annals and Magazine of Natural History,—Vol. XIV
(6th series), Nos. 83 and 84.

———. The Chemical News,—Vol. LXX, Nos. 1830 and 1831.

———. The Entomologist,—Vol. XXVII, Nos. 378 and 379.

———. The Entomologist's Monthly Magazine,—Vol. V (2nd series),
Nos. 59 and 60.

———. The Ibis,—Vol. VI (6th series), No. 24.

———. The Journal of Botany,—Vol. XXXII, Nos. 383 and 384.

———. The London, Edinburgh and Dublin Philosophical Magazine
and Journal of Science,—Vol. XXXVIII (5th series), Nos. 234 and
235.

London. The Messenger of Mathematics,—Vol. XXIV (new series), No. 4.

———. Numismatic Circular,—Vol. III, No. 26.

———. Quarterly Journal of Microscopical Science,—Vol. XXXVII (New Series), No. 145.

New Haven. The American Journal of Science,—Vol. XLVIII (3rd series), Nos. 286 and 287.

Paris. L'Académie des Sciences,—Comptes Rendus des Séances, Tome CXIX, Nos. 14-22.

———. Annales de Chimie et de Physique,—Novembre et Décembre, 1894.

———. Revue Critique d'Histoire et de Littérature,—Tome XXXVIII, Nos. 41-48.

———. Revue Scientifique,—Tome II (4^e Série), Nos. 25 et 26 ; III, 1-3.

BOOKS PURCHASED.

DANVERS, FREDERICK CHARLES. The Portuguese in India, being a history of the rise and decline of their Eastern Empire, Vols. I-II. 8vo. London, 1894.

GRIFFITH, F. Ll. Archæological Report, 1893-94 ; comprising the work of the Egypt Exploration Fund and the progress of Egyptology during the year 1893-94. 8vo. London, 1894.

KIRBY, W. F. J. Hübner Exotische Schmetterlinge. Plates 54, 61-70. 4to. Brussels, 1894.

Memorials of Old Haileybury College. 8vo. Westminster, 1894.

RĀY, PRATĀPA CHANDRA. The Mahabharata, translated into English prose, Part 93. 8vo. Calcutta, 1894.



PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR MARCH, 1895.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday, the 6th March, 1895, at 9-15 P. M.

ALEX. PEDLER, ESQ., F.R.S., President, in the chair.

The following members were present :—

F. Finn, Esq., Dr. G. A. Grierson, A. Hogg, Esq., T. H. Holland, Esq., The Rev. H. B. Hyde, J. Mann, Esq., Dr. F. P. Maynard, Dr. D. M. Moir, Paṇḍit Haraprasād Çāstrī, C. R. Wilson, Esq.

The minutes of the last meeting were read and confirmed.

Twenty-six presentations were announced, details of which are given in the Library List appended.

The following gentlemen duly proposed and seconded at the last meeting of the Society, were ballotted for and elected Ordinary Members :—

A. F. M. Abdur Rahman, Esq.
P. C. Rāya, Esq.
Bābu Rājeçvara Mitra.
J. C. Bose, Esq.

The following gentlemen are candidates for election at the next meeting :—

The Hon. Mr. J. A. Bourdillon (for re-election), proposed by A. Pedler Esq., seconded by C. R. Wilson, Esq.

J. H. Gilliland, Esq., proposed by A. Pedler, Esq., seconded by C. Little, Esq.

The Rev. J. L. Peach, M. A., proposed by A. Pedler, Esq., seconded by T. D. Beighton, Esq.

The SECRETARY read the names of the following gentlemen who had been appointed to serve on the various Committees for the present year:—

FINANCE AND VISITING COMMITTEE.

H. K. W. Arnold, Esq.	Dr. A. F. R. Hoernle.
Bābu Pratāpa Candra Ghōṣa.	Dr. J. Scully.
C. L. Griesbach, Esq.	Colonel J. Waterhouse.

LIBRARY COMMITTEE.

H. K. W. Arnold, Esq.	Dr. Āçutoṣa Mukherjee.
Bābu Gaurdās Basāk.	L. de Nicéville, Esq.
Dr. D. D. Cunningham.	Paṇḍit Nīlamanī Mukherjee Nyā-
G. W. Forrest, Esq.	yālaṅkāra.
Bābu Pratāpa Candra Ghōṣa.	Mahāmahopādhyāya Maheṣa
His Grace the Most Rev. Dr. P. Goethals.	Candra Nyāyaratna.
Dr. A. F. R. Hoernle.	Dr. G. Ranking.
The Rev. H. B. Hyde.	Dr. Mahendralāl Sarkār.
Prince Sir Jehan Qudr Muhammad	Dr. J. Scully.
Wahid Ali Bahadur.	Major R. C. Temple.
J. Mann, Esq.	Colonel J. Waterhouse.
	Dr. G. Watt.

PHILOLOGICAL COMMITTEE.

Maulvie Ahmad.	Mahāmahopādhyāya Maheṣa Can-
Sir Sayid Ahmad.	dra Nyāyaratna.
Bābu Gaurdās Basāk.	F. E. Pargiter, Esq.
Dr. A. Führer.	Captain D. C. Phillott.
Bābu Pratāpa Candra Ghōṣa.	Dr. G. Ranking.
Dr. A. F. R. Hoernle.	Rai Rāj Kumār Sarvādhikārī Ba-
Maulvie Khudabaksh Khan Bahadur.	hadur.
J. Mann, Esq.	Dr. Mahendralāl Sarkār.
Dr. Āçutoṣa Mukherjee.	Major R. C. Temple.
Paṇḍit Nīlamanī Mukherjee Nyā-	Dr. G. Thibaut.
yālaṅkāra.	A. Venis, Esq.

COINS COMMITTEE.

Dr. A. Führer.	Dr. J. Scully.
Dr. A. F. R. Hoernle.	V. A. Smith, Esq.
C. J. Rodgers, Esq.	E. Thurston, Esq.

HISTORY AND ARCHÆOLOGICAL COMMITTEE.

The Hon'ble Mr. Justice Amir Ali.	His Grace the Most Rev. Dr. P.
H. K. W. Arnold, Esq.	Goethals
Bābu Gaurdās Bāsāk.	The Rev. H. B. Hyde.
W. H. P. Driver, Esq.	Paṇḍit Mahanlal Vishanlal Pandia.
Dr. A. Führer.	Major R. C. Temple.
Bābu Pratāpa Candra Ghoṣa.	

NATURAL HISTORY COMMITTEE.

E. C. Cotes, Esq.	R. D. Oldham, Esq.
Dr. D. D. Cunningham.	S. E. Peal, Esq.
J. F. Duthie, Esq.	Dr. D. Prain.
Dr. G. M. Giles.	Dr. J. Scully.
T. H. Holland, Esq.	R. E. S. Thomas, Esq.
C. S. Middlemiss, Esq.	E. Thurston, Esq.
L. de Nicéville, Esq.	Dr. G. Watt.
Dr. Fritz Noetling.	

PHYSICAL SCIENCE COMMITTEE.

Dr. J. R. Adie.	C. S. Middlemiss, Esq.
P. N. Bose, Esq.	Dr. Ācutoṣa Mukherjee.
Dr. D. D. Cunningham.	Dr. Fritz Noetling.
J. Eliot, Esq.	R. D. Oldham, Esq.
Dr. G. M. Giles.	Dr. D. Prain.
T. H. Holland, Esq.	Dr. Mahendralāl Sarkār.
Dr. G. King.	Dr. J. Scully.
The Rev. Father E. Lafont.	Dr. W. J. Simpson.
J. J. D. La Touche, Esq.	Colonel J. Waterhouse.

ANTHROPOLOGICAL COMMITTEE.

W. Crooke, Esq.,	S. E. Peal, Esq.
M. L. Dames, Esq.	Rai Rāj Kumār Sarvādhikārī Baha-
Bābu Çarat Candra Dās.	dur.
E. A. Gait, Esq.	Major R. C. Temple.
R. Greeven, Esq.	E. Thurston, Esq.
J. Mann, Esq.	Dr. G. Watt.

The PHILOLOGICAL SECRETARY read a circular from the Secretary, Nagari Prachārini Sabhā, Benares, enumerating prizes for essays on certain subjects in Hindi. This can be seen in the Society's Office.

The PHILOLOGICAL SECRETARY exhibited four Arabic tombstones, sent by Surgeon-Major Brazier-Creagh from an old cemetery in the Kosh

Valley under the lofty Tuftan active volcano in Eastern Persia. The first, second, and fourth stones were andesites, and the third limestone.

The following papers were read :—

1. *Third Instalment of Indian Folk-lore Beliefs about the Tiger.*—By Bābu ÇARAT CANDRA MITTRA, M.A., B.L. *Communicated by the Philological Secretary.*

The paper will be published in the *Journal*, Part III.

2. *Errata and Addenda to Blochmann's Translation of the Ain-i-Akbari.*—By MRS. HENRY BEVERIDGE. *Communicated by the Philological Secretary.*

The paper will be published in the *Journal*, Part I.

3. *Contributions to the theory of Warning Colours and Mimicry, No. 1.*—By F. FINN, ESQ., B.A., F.Z. S.

The paper will be published in the *Journal*, Part II.

LIBRARY.

The following additions have been made to the Library since the meeting held in February last.

TRANSACTIONS, PROCEEDINGS, AND JOURNALS,

presented by the respective Societies and Editors.

Baltimore. Johns Hopkins University,—Circulars, Vol. XIV, No. 116.

Caen. La Société Linnéenne de Normandie,—Bulletin, Tome VIII (4^e série), No. 3.

Calcutta. Indian Engineering,—Vol. XVII, Nos. 6–9.

———. Maha-bodhi Society,—Journal, Vol. III, Nos. 10 and 11.

———. The Medical Reporter,—Vol. V, Nos. 3–5.

———. Microscopical Society of Calcutta,—Bulletin, Vol. IV, No. 1.

Copenhagen. Kongelige Nordiske Oldskrift-Selskab,—Aarboger, Bind IX (II Raekke), Heft 3.

Havre. Société de Géographie Commerciale du Havre,—Bulletin Novembre-Décembre, 1894.

Leipzig. Der Deutschen Morgenländischen Gesellschaft,—Zeitschrift, Band XLVIII, Heft 4.

London. The Academy,—Nos. 1186–89.

———. The Athenæum,—Nos. 3509–12.

———. Anthropological Institute of Great Britain and Ireland,—Journal, Vol. XXIV, No. 3.

———. Geological Society,—Quarterly Journal, Vol. LI, Part 1.

- London. Institution of Electrical Engineers,—Journal, Vol. XXIII, No. 114.
- . Nature,—Vol. LI, Nos. 1317–20.
- . Royal Geographical Society,—Geographical Journal, Vol. V, No. 2.
- Madras. The Indian Journal of Education,—January 1895.
- Moscow. La Société Impériale des Naturalistes de Moscou,—Bulletin, No. 3, 1894.
- Mussoorie. The Indian Forester,—Vol. XXI, No. 2.
- Paris. Société de Géographie,—Comptes Rendus des Séances, Nos. 1 et 2, 1895.
- . Société Philomathique de Paris,—Comptes Rendus Sommaire des Séances Nos. 6 et 7, 1895.
- Pisa. Società Toscana di Scienze Naturali,—Atti, Processi Verbali, Tome IX, 1 Luglio et 18 Novembre, 1894.
- Rome. Società Degli Spettroscopisti Italiani,—Memorie, Tome XXIII, Nos. 11 et 12.
- St. Petersburg. L' Académie Impériale des Sciences de St. Petersburg,—Bulletin, Tome II (V^e série), No. 1.
- Taiping. Perak Government,—Gazette, Vol. VIII, Nos. 3–5.
- Tring. Novitates Zoologicae,—Band II, No. 1.
- Turin. R. Accademie della Scienze di Torino—Atti, Tome XXX, Nos. 1–4.
- Vienna. Dr. K. K. Zoologisch-botanischen Gesellschaft in Wien,—Verhandlungen, Band XLIV, Heft 3 and 4.
- Zurich. Der Naturforschenden Gesellschaft in Zürich,—Neujahrsblatt, XCVII.
- . ———. Vierteljahrsschrift, Band XXXIX, Heft 3 and 4.

BOOKS AND PAMPHLETS.

presented by the Authors, &c.

- MURDOCH, DR. J. History of Christianity in India. 8vo. Madras, 1895.

MISCELLANEOUS PRESENTATIONS,

- Ara. A Journal of Literature and of Armenian Politics and History, Vol. IV. No. 2. 8vo. Calcutta, 1895.

J. D. MELIK BEGLAR, ESQ.

- Report of the sixty-fourth meeting of the British Association for the Advancement of Science held at Oxford in August 1894. 8vo. London, 1894.

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, LONDON.

Catalogue of the Calcutta Public Library, Vol. I. Revised up to November 1894. 8vo. Calcutta, 1894.

CALCUTTA PUBLIC LIBRARY.

Annual Report of the Department of Agriculture for the year 1893-94. 8vo. Brisbane, 1894.

TRYON, HENRY. The Disease affecting the Orange Orchards of Wide Bay, and the Insect Pest prevalent therein. 8vo. Brisbane, 1894.

DEPARTMENT OF AGRICULTURE, BRISBANE.

Results of Observations of the fixed stars made with the Meridian Circle at the Government Observatory, Madras, Vol. VIII. 4to. Madras, 1894.

GOVERNMENT OBSERVATORY, MADRAS.

Report on the Administration of the Salt Department during the year 1893-94. Fcp. Calcutta, 1894.

Report on the River-borne Traffic of the Lower Provinces of Bengal, and on the Inland Trade of Calcutta, and on the Trade of Chittagong Port for the year 1893-94. Fcp. Calcutta, 1894.

Resolution reviewing the reports on the working of Municipalities in Bengal during the year 1893-94. Fcp. Calcutta, 1894.

Returns of the Rail and River-borne Trade of Bengal during the quarter ending the 30th September 1894. Fcp. Calcutta, 1895.

WILSON. H. D. The Province of South Australia. 8vo. Adelaide, 1894.

GOVERNMENT OF BENGAL.

North Indian Notes and Queries for November and December, 1894. 4to. Allahabad, 1894.

GOVERNMENT OF INDIA, HOME DEPARTMENT.

Epigraphia Indica and Records of the Archæological Survey of India, Vol. III, Part 6. 4to. Calcutta, 1894.

List of Photographic Negatives belonging to the India Office, London. Fcp. London, 1894.

GOVERNMENT OF INDIA, REVENUE AND AGRICULTURAL DEPARTMENT.

Report on the Administration of the Madras Presidency during the year 1893-94. Fcp. Madras, 1894.

GOVERNMENT OF MADRAS.

Report on the Administration of the Punjab and its Dependencies for 1893-94. Fcp. Lahore, 1894.

GOVERNMENT OF THE PUNJAB.

Annual Report of the Indian Museum, April 1893 to March 1894. 8vo. Calcutta, 1894.

INDIAN MUSEUM.

List of the Patrons, Office-bearers and Members of the Keshi Nagari Prachariní Sabha, Benares, January, 1895. 8vo. Benares, 1895.

KASHI NAGARI PRACHARINÍ SABHA, BENARES.

Monthly Weather Review for September and October, 1894. 4to. Calcutta, 1895.

Original Meteorological Observations of Calcutta, Allahabad, Lucknow, Lahore, Nagpur, Bombay and Madras for September and October, 1894. 4to. Calcutta, 1895.

METEOROLOGICAL REPORTER TO THE GOVERNMENT OF INDIA.

An Historical and Descriptive account of the Field Columbian Museum, Chicago. 8vo. Chicago, 1864.

FREDERICK J. V. SKIFF, ESQ.

Catalogue of Yale University, 1894-95. 8vo. New Haven, 1894.

YALE UNIVERSITY, NEW HAVEN.

PERIODICALS PURCHASED.

Allahabad. North Indian Notes and Queries,—Vol. IV, Nos. 8 and 9.

Calcutta. Indian Medical Gazette,—Vol. XXX, No. 2.

Geneva. Archives des Sciences Physiques et Naturelles,—Tome, XXXIII, No. 1.

Leipzig, Annalen der Physik und Chemie,—Band, LIV, Heft 2.

———. ———. Beiblätter, Band XVIII, Heft 12; XIX, 1.

London. Numismatic Circular,—Vol. III, No. 27.

———. Rhopalocera Exotica,—Part 30.

Paris. Revue Scientifique,—Tome III (4^e Série), No. 4.

BOOKS PURCHASED.

SMITHERS, LEONARD C. The book of the thousand Nights and a Night. Translated from the Arabic, by Captain Sir R. F. BURTON; Vols. I-XII. 8vo. London, 1894.

TAYLOR, ISAAC. The Alphabet; an account of the Origin and Development of Letters, Vols. I-II. 8vo. London, 1893.



PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR APRIL, 1895.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday, the 3rd April, 1895, at 9-15 P. M.

SURGEON-LIEUTENANT-COLONEL GEORGE RANKING, M.D., in the Chair.

The following members were present :—

Dr. A. W. Alcock, F. Finn, Esq., His Grace the Most Rev. Dr. P. Goethals, Dr. G. A. Grierson, Kumār Rāmeçvar Māliā, J. Mann, Esq., C. R. Wilson, Esq.

The minutes of the last meeting were read and confirmed.

Fourteen presentations were announced, details of which are given in the Library List appended.

The following gentlemen duly proposed and seconded at the last meeting of the Society were ballotted for and elected Ordinary Members :—

The Hon'ble Mr. J. A. Bourdillon (re-elected).

J. H. Gilliland, Esq.

The Rev. J. L. Peach, M. A.

The following gentleman is a candidate for election at the next meeting :—

Maulavie Abdus Salam, M.A., Deputy Magistrate and Deputy Collector, proposed by Dr. A. F. R. Hoernle, seconded by Dr. G. A. Grierson.

The following gentleman has expressed a wish to withdraw from the Society :—

A. S. Lovelock, Esq.

The SECRETARY reported the death of the following Honorary Members :—

Major-General Sir H. C. Rawlinson, Bart., G.C.B., &c.
Professor Hermann, L. E. Helmholtz.

The PHILOLOGICAL SECRETARY (Numismatic) read reports on the following finds of Treasure Trove Coins.

(I) REPORT ON three old silver coins, forwarded by the Collector of Murshidābād, with his No. 1356 G., dated Berhampur, the 8th April, 1894.

1, The coins are stated to have been found at Bhattabaṭī in Thana Manulla Bazār, while digging earth for making bricks.

2, They are rupees of Shāh 'Ālam, of the Murshidābād mint, and of the years 1189, 15² and [1178], 5. One of them is like No. 1188, and two like No. 1193 of the British Museum Catalogue.

(II) REPORT ON 59 old silver coins, forwarded by the Collector of Bīrbhūm, No. 38 G., dated Surī, the 13th April, 1894.

The Collector, in his letter addressed to the Commissioner of the Burdwan Division, No. 1036 G., dated Surī, the 27th November, 1893, states, that in the August preceeding, treasure consisting of 60 whole rupees, 16 half-rupees, and 43 quarter-rupees, was found in digging earth for rebuilding a house in the village of Bhavānīpur, within the Rājnagar outpost. Of this treasure only the half- and quarter-rupees were acquired for the Government, total 59 coins, which form the subject of the present report.

All the 59 coins are of British mintage, and (with one exception) of mint Murshidābād, San 19, as described in Mr. Thurston's History of the East India Company's Coinage, pp. 41–43. They may be detailed as follows :—

a,	With oblique milling, issue of 1793–1818, half-rupees,		
	as in Br. Mus. Cat., Nos. 39, 40.....	6	
	quarter-rupees, as in Br. Mus. Cat., Nos. 41, 42	11	17
b,	With straight milling, issue of 1818–1832, half-rupees,		
	as in Br. Mus. Cat., No. 46.....	1	
	quarter-rupees, not in Br. Mus. Cat.	28	29
c,	With plain edges and serrated rim, issue of 1832–1835,		
	half-rupees, as in Br. Mus. Cat., No. 49	9	
	quarter-rupees, not in Br. Mus. Cat.	3	12

Total :— 58

The remaining piece is a quarter-rupee of the Sūrāt mint, date 1215, with plain edges, San 46, as in Br. Mus. Cat., No. 100.

(III) REPORT ON 17 old silver coins, forwarded by the Deputy Commissioner of Nāgpur, with his No. 3354/656, dated Nāgpur, 30th May, 1894.

The coins are stated to have been found on the 18th October, 1893. The exact locality of the find is not mentioned.

The coins are old Nāgpurī Rupees of native mintage, in the usual indifferent condition, and of a very common type. Sixteen among them are issues of Aḥmad Shāh Bahādur (1161–1167 A.H. = 1748–1754 A.D.) and one of Shāh 'Ālam. Some of the former show the mint name Sūrat, others seem to have Katak. The date is lost on all of them.

(IV) REPORT ON 51 old silver coins, forwarded by the Deputy Commissioner of Nāgpur, with his No. 4558/656, dated Nāgpur, 23rd July, 1894.

The coins are stated to have been found in Mouza Kumbhārī, Tahsil Ramtek, while digging in a field.

They are small silver coins, of the kind generally known as "Gadia." They are described and figured in the late Sir A. Cunningham's *Coins of Mediæval India*, p. 53, plate VI., figs. 7 and 8, and elsewhere. The coins of the present find are of two slightly differing varieties or dies, and very much clipped.

(V) REPORT ON eleven old silver coins, forwarded by the Deputy Commissioner of Shāhpur, with his No. 751, of 2nd November, 1895.

The coins are stated to have been found in the town of Mianī in the Shāhpur district.

They are all rupees of the Durrānī king of Afghanistan, Maḥmūd Shāh, who reigned from 1216–1245 A.H. = 1801–1829 A.D. They are also all of the Kashmīr mint, and of the year 1217, regnal 2.

(VI) REPORT ON five old silver coins, forwarded by the Collector of Champāran, with his No. 832, dated Mōṭihārī, the 5/16th November, 1894.

The Collector reports in his letter, addressed to the Commissioner of the Patna Division, No. 831, dated Mōṭihārī, 5/16th November, 1893, that in February, 1893, hidden treasure, amounting to Rs. 2,000, was found in the village of Dumrī, under a pakka wall. Only 5 coins of this treasure were recovered by the police.

These five coins are rupees of the following Mughul emperors of Delhi:—

a, AKBAR, 963–1014 A.H. = 1556–1605 A.D.

An Ilahī rupee, month Isfandārmuz, of the Aḥmad-ābād mint, regnal year 41 (?), like Br. Mus. Cat.,

No. 178 I

<i>b</i> , JAHĀNGĪR, 1014–1037 A.H.=1605–1627 A.D., type as in Br. Mus. Cat., No. 472, mint Qandahār, date lost, regnal year 12	1
<i>c</i> , SHĀH JAHĀN, 1037–1068 A.H.=1627–1658 A.D., type as in Br. Mus. Cat., No. 643, mint Patna, date 1067, regnal lost, month lost	1
<i>d</i> , AURANGZĪB, 1068–1118 A.H. = 1658–1707 A.D., two varieties, like Br. Mus. Cat., Nos. 731 and 777, mint of one Sūrāt, dates [10]72 and 1109, regnal of one 41 ...	2

(VII) REPORT ON two old silver coins, forwarded by the Deputy Commissioner of Mandla, with his No. 2366, dated 12th November, 1894.

No information is given in the letter of the Deputy Commissioner with reference to the locality and date of finding the coins.

They are square rupees of Akbar, with the Kalimah, of the type shown in the Br. Mus. Cat., Nos. 127–151. Their dates are 1000 (in numeral figures, not expressed by *alif*) and 996. Their mints are lost.

(VIII) REPORT ON 24 old coins, forwarded by the Deputy Commissioner of Rawalpindi, with his No. 2568 G., of 16th November, 1894.

The coins are stated to have been found near Hasan abdal Tahsil Attock, in the Rawalpindi District.

All the coins are of impure gold, and belong to the class known as “Class B., Coins of the Great Kuṣāns,” described by the late Sir A. Cunningham in the London Numismatic Chronicle, Part II for 1893, pp. 120–124.

The present collection consists of coins of three varieties, distinguished, as follows :—

No. of specimens.

First variety ; with two sub-varieties :—

1st sub-variety: with the legends <i>bha</i> , <i>sita</i> and <i>ṣāka</i> , as described and figured by Sir A. Cunningham, in (<i>his</i>) Plate II, No. 2, fig. 124 (<i>l.c.</i>) :	13
2nd sub-variety, with <i>vi</i> instead of <i>bha</i>	1

N.B.—The legend is *ṣāka*, with long *ā*, as Sir A. Cunningham rightly observes (*l.c.*, p. 122) not *ṣaka* as Thomas and V. Smith (*Journal*, A. S. B., for 1894, p. 182, footnote 2) read. The long *ā* is indicated by the curve at the top of the right-hand stroke of the letter *sh*, which is distinctly shown in Cunningham’s figure 2.

Second variety ; with legends *bhadra* and *pakaṇḍhi*,
as in Cunningham's Plate II, figure 12, p. 124 6

Third variety ; with two sub-varieties :—

1st sub-variety : legends *bha*, *saya* and *ṣāka*, as
in Cunningham's Plate II, figure 6 3

2nd sub-variety : legends *vi*, *saya* and *ṣāka*. Not
in Cunningham..... 1

N.B.—The *ya* of *saya*, in sub-variety 1, has the
old tridentate form, while in sub-variety 2,
it has the modern form. One specimen of
the 1st sub-variety reads *ṣāna* for *ṣāka*,
which is probably a mere fault of minting.

(IX) REPORT ON 66 old silver coins, forwarded by the Deputy Commissioner of the *Shāhpur* District, with his No. 45, of 21st January, 1895.

The coins are stated to have been found in the village of *Khabakki*.

They belong to the so-called class of punch-marked coins, and are of two different types, *viz.*, 26 are circular and 40 are angular (square or oblong). They are fully described and figured in the late Sir. A. Cunningham's *Coins of Ancient India*, pp. 54ff., plate I, fig. 1–19.

(X) REPORT ON 179 old coins, forwarded by the Deputy Commissioner of *Gujranwālā*, with his No. 1435, dated 2nd October, 1894.

The coins are stated to have been found in the village of *Sadhu Guraoja* in the *Gujranwālā* District.

They are all small coins of mixed metal, of *Muḥammad Karluk* (*Nāṣiru-d-dīn*), about 658 A.H. = 1259 A.D., of the well-known type, published in *Prinsep's Indian Antiquities*, vol. I, plate II, fig. 14 and elsewhere.

(XI) REPORT ON 548 old copper coins, forwarded by the Collector of *Pūrī*, with his No. 1428, dated *Pūrī*, $\frac{22^{\text{nd}}}{25^{\text{th}}}$ September, 1893, and subsequent correspondence.

The Collector in his letter to the Commissioner of the *Orissa* Division, No. 1427, dated $\frac{20^{\text{th}}}{25^{\text{th}}}$ September, 1893, states, that the coins were found about the beginning of March, 1893, buried in a small earthen pot, 2 feet below the surface, while excavating earthworks at *Gurbai Salt Factory* by the Salt Department at *Manikaratna*. He reports that the villagers were of opinion, that the pieces are more a kind of medal worn as armlets by women ; and he adds, that the sh of some of them supports this theory, but that from the dies or it is probable that they were some ancient coins of small value

According to the Collector's letter to the Commissioner, there should have been 573 coins in the lot, but I have only been able to count 548. No number is stated in the Collector's letters to the Asiatic Society of Bengal; and it is, therefore, not quite certain what number of coins was actually dispatched to the Society. Unfortunately the coins were not counted immediately on arrival. They were received by me in an excessively bad state, thickly coated with ancient dirt and verdigris, and looking like a heap of rubbish. I had them first boiled in a sort of *purée* of tamarind, then put away to soak in the same for about 24 hours, and finally carefully cleaned by rubbing with towels. It is possible, that in the course of this process, the missing coins may have been destroyed or lost. In any case, the loss (if any) is trifling.

They are probably coins of the class current in certain parts of Ancient India, which are described and figured by the late Sir A. Cunningham in his *Coins of Ancient India*, pages 54–66, plates I–III. These coins existed in two distinct varieties: some were cast, while others were punched with dies (single or double). The coins of the present collection, with a few exceptions, belong to the former variety, of cast coins. Some of them still show the protruding marks of the mould in which they were cast. They are of very considerable interest for this reason that no coins of this particular type has ever before been found,—at least not to my knowledge. I shall, therefore, describe them in detail. See Plate II.

The best made of the coins are clearly die-struck ones. They are so much worn down by usage, that the designs on most of them are barely discernible. On some of them, however, sufficient remains to identify them with coins of the Indo-Scythian class. The obverse shows the well-known standing figure of king Kanishka, pointing with his right hand down to the fire-altar; the reverses show the figures of MAO or MIIPO, AΘPO (Pl. I, fig. 1), and OADO (Pl. I, fig. 2),* as seen on Kanerki coins. No trace of the legend remains; and in its absence, of course, it is impossible to be quite certain of the identity; but the resemblance of the figures on both the obverses and reverses to those on the corresponding Kanerki coins is very striking. The legends on the Kanerki copper coins were very brief, consisting of one or two words only, arranged along the margin; they would, therefore, be peculiarly liable to extreme erosion. The Kanerki copper coinage, however, was extensively imitated in the later Indo-Scythian period; and the coins here described, may belong to this rather than to the genuine, contemporary Kanerki

* Figure 2 on the Plate is made up of two coins. The reverse shows OADO; the obverse shows Kanerki from another coin.

coinage. Of these Indo-Scythian coins there are 47 in the present collection.

The whole of the remainder of the coins are cast coins, and very crude imitations of those of Kanerki. They all show two standing figures, one on each face of the coin, with their arms in varying positions. There is no legend, but most of them are marked with a crescent placed in varying parts of the field. Accordingly they may be distributed into the following classes and varieties.

CLASS I. No crescent on either side.

Variety 1 (Pl. II, fig. 3) : <i>obv.</i> , figure with r. arm pointing down, l. arm raised, <i>rev.</i> , r. arm downwards, l. arm a-kimbo	80
<i>N.B.</i> —In the case of some specimens belonging to this variety it is difficult to say whether they are struck or cast.	
Variety 2 (Pl. II, fig. 4) : <i>obv.</i> and <i>rev.</i> , both arms pointing down.	1
Variety 3 : <i>obv.</i> , r. arm pointing down, l. arm upwards ; <i>rev.</i> , both arms pointing upwards	1
Variety 4 (Pl. II, fig. 5) : arms bent right-angularly at elbow ; <i>obv.</i> , arm downwards, l. arm upwards ; <i>rev.</i> , r. arm upwards, l. arm downwards	1
Variety 5 : arms bent right-angularly at elbow ; <i>obv.</i> and <i>rev.</i> , r. arm upwards, l. arm downwards	1
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CLASS II, with crescent on the *reverse*, in the *left top* of the field :—

Variety 1 : <i>obv.</i> , r. arm level, l. arm raised ; <i>rev.</i> , r. arm is wanting, l. arm level	8
Variety 2 : <i>obv.</i> and <i>rev.</i> , r. arm raised, l. arm pointing down ; <i>rev.</i> , r. arm pointing down, l. arm raised	16
Variety 3 (Pl. II, fig. 6) : <i>obv.</i> and <i>rev.</i> , both arms level	6
Variety 4 (Pl. II, fig. 7) : <i>obv.</i> , r. arm level, l. arm raised ; <i>rev.</i> , r. arm pointing down, l. arm a-kimbo	6
Variety 5 : <i>obv.</i> and <i>rev.</i> , r. arm pointing down, l. arm raised.....	4
Variety 6 (Pl. II, fig. 8) : <i>obv.</i> , both arms bent at elbow at right angles, r. downwards, l. upwards ; <i>rev.</i> , r. upwards, l. downwards	1
Variety 7 : <i>obv.</i> , r. arm raised, l. arm pointing down ; <i>rev.</i> , both arms level	1
———— 42	

CLASS III, with crescent on *reverse* in *right top* of field :—

Variety 1 (Pl. II, fig. 9) : <i>obv.</i> , r. arm pointing down, l. arm raised ; <i>rev.</i> , r. arm pointing down, l. arm a-kimbo	258
Variety 2 Pl. II, fig. 10) : <i>obv.</i> and <i>rev.</i> , r. arm raised, l. arm pointing down	50
β, Variety 3 : <i>obv.</i> and <i>rev.</i> , both arms bent at elbow at right angles, r. upward, l. downwards	1
	— 309

CLASS IV, with crescent on both *obverse* and *reverse* :—

Variety 1 : crescent on r. top of *obverse*, and l. top of *reverse* :—

Sub-variety <i>a</i> : <i>obv.</i> , r. arm pointing down, l. arm raised ; <i>rev.</i> , r. level, l. arm a-kimbo.....	9
Sub-variety <i>b</i> (Pl. II, fig. 11) : <i>obv.</i> , both arms level ; <i>rev.</i> , r. arm level, l. arm pointing down	5
Variety 2 : <i>obv.</i> and <i>rev.</i> , crescent on l. top ; also <i>obv.</i> and <i>rev.</i> , r. arm pointing down, l. arm raised	1
Variety 3 : <i>obv.</i> and <i>rev.</i> , crescent, on r. top :—	
Sub-variety <i>a</i> : <i>obv.</i> and <i>rev.</i> , r. arm raised, l. arm pointing down	2
Sub-variety <i>b</i> : <i>obv.</i> , r. arm pointing down, l. arm raised ; <i>rev.</i> , r. arm level, l. arm a-kimbo.	2
	— 19

CLASS V (Pl. II, fig. 12), with crescent on head of *reverse* figure. *Obv.*, r. arm level, l. arm raised ; *rev.*, r. arm level, l. arm a-kimbo

1

— 1

Besides there are a number of specimens which are too badly preserved to admit of being classed in any of the above divisions ; altogether 46.

Regarding the age of these coins, some conclusion may be drawn from the fact of their association with coins which belonged to the Indo-Scythian coinage. They are clearly imitations of the latter coinage ; and it may be assumed that they would not have been made, unless the Indo-Scythian coins had still been current in Northern India. There would have been no object in copying an obsolete coinage. The period of the Indo-Scythian coinage is fairly well-known. Kanishka reigned in the last quarter of the first century A.D. His copper coinage, as well as imitations of it, passed current for about two centuries afterwards. They are found numerously in the Panjāb, and occasionally much further east. The present, I believe, is the first occasion of any

Indo-Scythian copper coins having been found in the extreme east of North India. The fact of their having been found near Pūrī, the site of an ancient shrine, and place of pilgrimage, may account for it. The cast coins of the present find are clearly local imitations of Indo-Scythian coins, and their age cannot well be later than the fourth century A.D. Whether they were intended to pass current as coins, in the ordinary sense, may not be quite certain. They may have been meant to be used as temple-offerings by the pilgrims, similar to certain imitations of Yaudhēya coins found in the Panjāb. Possibly they may have been only intended as ornaments.

The weights of the (apparently) Indo-Scythian coins I have found to vary between 120 and 230 grains. The weights of the cast coins are as follows :—

Class	I,	varying from 122 to 211 grains.
„	II,	„ „ 116 „ 176 „
„	III,	„ „ 106 „ 162 „
„	IV,	„ „ 112 „ 146 „
„	V,	„ „ 164.

The weight (full) of genuine Indo-Scythian Kanerki copper-coins, as given by Sir A. Cunningham, is from 130 to 260 grains.

(XII) REPORT on 32 old silver coins forwarded by the Collector of Burdwan, with his No. 2460G, dated the 18th March, 1895.

These coins belong to a lot of 63 which are said to have been dug out from a ruined house belonging to some persons in Rasūlpur, Thana Kulna, apparently in January, 1895. Only 32 of the lot, those now under report, were recovered by the police.

All the 32 coins are rupees of the Mughul emperor 'Ālamgīr II, who reigned from 1167–1173 H. = 1754–1759 A. D. They are all of the mint Murshidābād, and the year 1171 H. and the 4th regnal year. They bear the usual mint-mark of Murshidābād, a five-rayed star, on the reverse, but on the obverse they show, in addition, a small sun over the *he* of *bādshāh*, similar to that on the Murshidābād issue of 1180 H. of Shāh 'Ālam (see British Museum Catalogue, No. 1188, Plate XXIX).

(XIII) REPORT on 892 old copper coins, forwarded by the Deputy Commissioner of Mandla, with his No. 1991, dated the $\frac{15\text{th}}{24\text{th}}$ September, 1894.

These coins are stated to have been found in a field in the Mauzah Kindrī, in the Mandla Tahsil.

They are all square copper coins of the Sultāns of Mālvā. These copper coins used to be very superficially struck; accordingly the legends on most of them are worn out so much that neither name nor date can be recognized, though sufficient remains to show unmistakably the Mālvā type of coin. There are, however, a small number (less than 100) on which sufficient traces of a name or date remain, to attribute them more particularly, as shown below :—

GHIYĀṢ SHĀH, 880–906 H. = 1475–1500 A. D., of two sizes, no date legible	4
NĀṢIR SHĀH, 906–916 H. = 1500–1510 A. D., of two sizes, date 913 on one	8
MAḤMŪD SHĀH, 916–937 H. = 1510–1530 A. D., of two sizes, dates 916, 917, 918, 919 (?), 922 on 15 specimens	72
<hr/>	
Total ...	84

There are also two curious coins among the lot. They have the usual Mālvā type, but they show the name *Muḥammad* in full and quite distinct. There is no Sultān of that name known among the Khiljī house of Mālvā. In the Ghōrī house which preceded it, there is a Muḥammad Ghaznī Khān, who reigned 838–839 H., but he is not known to have struck any coins. Moreover the coins seem to show traces of the dynastic name Khiljī, and the mutilated date on one of them does not fit Muḥammad Ghaznī Khān. Of this date the unit figure 2 is quite distinct, it also shows a slightly mutilated decade figure, which (from the remains of it) can only be either 6 or 9, probably the former. The only date, that can be made up of these figures to agree with the known period of the Mālvā Sultāns, is 862 (or perhaps 892). The year 862 would fall within the reign of Maḥmūd I, while 892 would fall to Ghiyāṣ Shāh. The name, however, reads quite clear “Muḥammad,” not “Maḥmūd.”



(XIV) REPORT on 64 old gold coins, forwarded by the Deputy Commissioner of the Jhang District, with his No. 423, dated 1st April, 1895.

In a previous letter, No. 36, dated the 20th March, 1895, the coins are stated to have been found in the Jhang District, but no further particulars regarding the date and exact locality of the find are given. Together with the coins, a number of gold and silver ornaments, comprising thirteen sets, were sent. As to the finding of these ornaments,

no particulars whatever are given. They have every appearance of being modern manufacture.

The coins are of a mixture of gold and silver, and are very old. They are precisely of the same description, in every particular, as the 62 coins, found in 1888 in the Bijnōr District, N.-W. Provinces, and described and published by me in the *Proceedings* of this Society, for November, 1888, p. 205. They are also referred to in Mr. V. A. Smith's paper in the *Journal* of the Society for 1895, pp. 181, 184, on the "Coinage of the Gupta Period." The coins belong to the Class of the so-called "Later Indo-Scythian Coins," and to the Group of "Later Great Kuṣāns, Class B," or the Group of "Early Little Kuṣāns." I repeat their description, as it was given not quite correctly in the *Proceedings* for 1888.

Obv. Crude figure of king standing to left. Under his left arm *kidara*; outside spear *kshaṇa*; to left of king's right leg *kapana*, between this word and the leg one large dot or a cluster of dots (3 to 5).

Rev. Goddess, seated on throne with cornucopial in left hand; over her head a crescent, generally let into the dotted marginal circle. Monogram, in top of right field,  or . In the middle of right field, near the margin, a large letter, which seems to be *la* in some, *sa* and *sala* in other specimens.

The following is a list of the ornaments :—

1,	Earrings;	...	...	gold,	2 specimens.
2,	Ear-studs	...	...	"	3 "
3,	Locket	...	...	"	2 "
4,	Pieces	...	...	"	12 "
5,	Earrings,	...	...	silver,	25 "
6,	Bangles	...	...	"	2 "
7,	Do. (another kind)	...	...	"	4 "
8,	Do. (smaller)	...	...	"	6 "
9,	Armbands	...	...	"	16 "
10,	Collar	...	...	"	1 "
11,	Rings	...	...	"	2 "
12,	Bracelets	...	...	"	9 "
13,	Sets of balls	...	...	"	2 "

Total ... 86

The PHILOLOGICAL SECRETARY read an obituary notice of the death of Major-General Sir H. C. Rawlinson, Bart., G. C. B., &c.

The Council regret that it has fallen to them to report the death of Major-General Sir H. C. Rawlinson, Bart., G.C.B., F.R.S., D.C.L., Oxon., LL.D., Cantab. and Edin., K.L.S., and an Honorary Member of this Society since the year 1853.

Henry Creswicke Rawlinson was born at Chadlington, Oxfordshire, in 1810, and was educated at Ealing School. In 1827, when only seventeen years of age, he landed in India, and was attached to the Bombay Army till 1833. He was then deputed on political duty to Persia, where he was actively employed till the rupture of diplomatic relations with that country in 1839. On his return to India he was appointed British Agent at Kandahar, which he successfully held from 1840 to 1842, during the disasters of the Kabul war.

In 1844, he returned to political duties in Persia, where in the year 1851 he rose to the rank of Consul-General, from which post he retired in 1855, only to be made, on his return to England, a Crown Director of the East India Company. In 1856, he retired from Indian Service with the title of K.C.B., and, after a short period spent in the Council of India, he was sent in 1859, as Envoy and Minister Plenipotentiary, to Teheran, where he remained till 1868. In that year he returned to England and was again appointed a Life Member of the Secretary of State's Council. In 1891, he was created a Baronet "in recognition of his distinguished services to the State, stretching over a long period of years."

In addition to the above-named English honours, Sir Henry Rawlinson was a "Chevalier of the Order of Merit" of Prussia, an "Associé étranger" of the French Institute, and a Foreign Honorary Member of the Vienna Imperial Academy of Sciences. He was also a Knight of the First Class of the Persian Order of the Lion and the Sun.

To Members of this Society his claims to literary recognition are well known. As a political writer his authority on the Eastern question has long been established by the series of articles commencing with a paper on that subject in the *Quarterly Review* for 1849, and culminating in his *England and Russia in the East*, which appeared in 1875, and is still looked upon as a work of first class importance. The seventeen years spent in Persia and Turkish Arabia were, however, not devoted to politics alone. As a linguist Henry Rawlinson stood in the first rank of the brilliant band of discoverers of the middle of this century. His numerous papers, commencing in the year 1846, on the antiquities of the East, and more especially on the cuneiform inscrip-

tions of Persia, Assyria and Babylonia, including his famous copy of Behistun inscription made in 1847, and published two years latter, which appeared in the Journals of the Geographical and Royal Asiatic Societies have given him an imperishable name. As Professor Max Müller well remarks, if we followed the process by which Grotefend, Burnouf, Lassen and Rawlinson arrived at the decipherment of the cuneiform tablets, we should see that “the discovery of the alphabet, the language, the grammar, and the meaning of the inscriptions of the Achæmenian dynasty deserves to be classed with the discoveries of a Kepler, a Newton, or a Faraday.”

The PHILOLOGICAL SECRETARY exhibited an ancient map of Bhakar on the Indus, and read the following letter from Mr. T. D. La Touche, of the Geological Survey, from whom it had been received.

“I am sending you by parcel post a tracing of an ancient plan of the island of Bhakar, on the Indus, with portions of the towns of Rohrī and Sukkur, which may be of interest to some of the members of the Society.

I have not been able to learn much of the history of the plan, but what follows was told me by the Mukhtiār-kār of Rohrī, through whom the plan was obtained from the owner by Mr. Pratt, Deputy Collector of Rohrī, who lent it to me for copying.

The owner is a Sayyad, Ya‘qūb ‘Alī by name, whose ancestor was, at the time of Akbar’s annexation of Sind (1591–92), sub-governor of Rohrī, and was made by him governor of the island of Bhakar. The plan was made by Akbar’s order, by an artist whose name is unknown, in duplicate, one copy being sent to the Emperor at Delhi, and the other handed down in the governor’s family. It would be interesting to learn whether the other copy, sent to Delhi, is still in existence or not.

The plan is, I imagine, a fairly faithful representation of the aspect of Bhakar as it was before the buildings were demolished. The most interesting point about the whole plan is, however, the building shown in the middle of the river, standing on a rock below the island of Sudh-bēlā. This building has entirely disappeared now; indeed, it is evident that at the time the plan was made, the rock on which it stood was

much undercut by the river, and now not a vestige of the rock itself remains. I am told however, that the existence of a hospice or place of refuge, in the middle of the river at Bhakar is mentioned by ancient travellers in Sind, and this is probably the building referred to.

The great tower or Minaret of Mīr Muḥammad Ma'sūm, which is so conspicuous an object in Sukkur at the present time, is shown near the lower end of the plan. I have only doubtfully been able to identify any of the other tombs with those now in existence, which are all in a more or less ruinous condition. I have had a translation made of all the inscriptions on the plan, and append it herewith.

The method of fishing for 'Pulla' with nets by men floating down the stream during the floods on earthen pots, is a common sight in Sukkur at the present day. The form of net and method of killing the fish before slipping it into the 'ghara' has not changed in the slightest degree.

It is somewhat curious that not a single camel is shown on the plan, but there are three elephants, which are never seen in Sind nowadays, one of them being ferried across the river on a boat. The distinctive Sindhī hat is also conspicuous by its absence. It was not introduced into Upper Sind, I believe, till comparatively recently."

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- (28) Chasm of Jaldesi Mount. 28 پوده کوه جلدیسي -
- (29) Palaces of Afghans, in the town Sakkar. 29 حويلهای افغانان در قصبه سکر -
- (30) Hill-graves. 30 کوه قبرستان -

- (31) Precipitous slope near town of Lohrī (Rohrī). 31 تکر بوله که متصل قصبه لوهري است -
- (32) The rock of Bahkah Slope, near town Lohrī. 32 کوه بهکه تکر جانب قصبه لوهري -
- (33) Tower of Rai Kīshun Dās, Qanūngu. 33 گنبدی رای کشنداس قانونگو -
- (34) Quadrangle of Balad Khān in fort. 34 میانی بلد خان در قلعه -
- (35) Gun of the Fort. 35 توپ قلعه -
- (36) Has towers. 36 گنبد ها می دارد -
- (37) Green gate of Fort. 37 سبز دروازه قلعه -
- (38) Well in the Fort. 38 چاه در میان قلعه -
- (39) Commissariat Storehouse for rations. 39 انبارها اذوقه قلعه -
- (40) Physician's house in the Fort situated above the fishermen's houses. 40 عمارت حکیم در قلعه بالای میانی ملاحان -
- (41) Public road of town Sakkar. 41 گذر قصبه سکهر -
- (42) House belonging to Mir 'Abdu-l-Awwal. 42 حویلی میر عبدل اول -
- (43) Resting-house. 43 استانه بخش سرور -
- (44) Jām'a Mosque, town Sakkar. 44 مسجد جامع قصبه سکهر -
- (45) Houses of Tirath Caudhrī, in town Sakkar. 45 خانهای تیرته چودھری قصبه سکهر -
- (46) Police *cabūtra* of town Sakkar. 46 چودھری کوتوالی قصبه سکهر -
- (47) Public road of town Sakkar. 47 دروازه کلھری در قصبه سکهر -
- (48) Shrine of Nūr Qabulī. 48 درگاه نور قابلی -
- (49) Jām'a Mosque, Bhakkar. 49 مسجد جامع قلعه بهکر -
- (50) Kakrī gate leading from Fort. 50 دروازه ککری از قلعه -
- (51) House of Khwāja 'Abdū-l-Manṣabdar. 51 حویلی خواجه عبدل منصبدار -
- (52) Circular gate of barbers, house in the town Lohrī (Rohrī). 52 چرخ دروازه حجام خانه قصبه لوهري -
- (53) Mint of Qasbah Lohrī. 53 دارا ضرب قصبه لوهري -

- (54) House of Shaikh 'Ināyatu-l-lāh of Revenue Collector. 54 حویلی داروغہ گزربان محال سایر سوکار -
- (55) Mosque belonging to late Darōghā. 55 مسجد بنا کردہ شیخ عنایت اللہ داروغہ معزول -
- (56) Tomb of Pir Hājī Dar-iāi. 56 مقبرہ پیر حاجی دریائی -
- (57) Gun. 57 توپ -
- (58) Bazar of Kakrī gate, in the middle of Bhakkar Fort. 58 بازار ککری دروازہ درمیان قلعہ بہکر -
- (59) Oil factory. 59 خانہ کینکگیر در قلعہ -
- (60) Mosque of Qāzī. 60 مسجد قاضی -
- (61) Houses of Qāzīs, in the Fort of Bhakkar. 61 خانہای قضات قلعہ بہکر -
- (62) Kalhrī bazar in the Bhakkar Fort. 62 بازار کلہری درمیان قلعہ بہکر -
- (63) Kalhrī gate in the Fort. 63 دروازہ کلہری اندرون قلعہ -
- (64) Garden of Mirza Muqīm. 64 باغ مرزا مقیم -
- (65) House of Afzal Beg, Mansabdar. 65 خانہ افضل بیگ منصب دار -
- (66) House of Mīr Hasan 'Alī. 66 حویلی میر حسن علی -
- (67) Shēr Hājī (name of a road) outside fort. 67 شیر حاجی بیرون قلعہ -
- (68) Manik Cauk (Junction roads), in the middle of bazar of Bhakkar Fort. 68 مازک چوک درمیان بازار قلعہ بہکر -
- (69) Bazar of Kan-gate in the Fort. 69 بازار کن دروازہ درمیان قلعہ -
- (70) Kan-gate in the Fort. 70 دروازہ کن اندرون قلعہ -
- (71) Old cotton stacks inside Fort. 71 قلعہ اندرون کھنڈہ بارینباہا -
- (72) House of Governor of Lohrī. 72 حویلی حاکم نشین قصبہ لوہری -
- (73) Tomb of Khwāja Shāh Zamān. 73 گنبد خواجہ شاہ زمان -
- (74) Garden road in Fort. 74 باغ گذرگاہ در قلعہ -
- (75) Old houses in the Fort of Bhakkar belonging to Governor. 75 محلات قدیم قلعہ بہکر جایی حاکم نشین -
- (76) Mausoleum Sultān Ṣadru-d-dīn in the Bhakkar Fort. 76 روضہ سلطان صدر الدین در قلعہ بہکر -
- (77) Bazar of Main-gate in the Bhakkar Fort. 77 بازار ناک دروازہ درمیان قلعہ بہکر -

- (78) Main-gate in the Fort. 78 ناک دروازه در اندرون قلعه -
- (79) Main-gate outside the Fort. 79 ناک دروازه بیرون قلعه -
- (80) Plan of the Fort Bhakkar. 80 این صورت قلعه بهکر -
- (81) Pleasure garden in the Fort. 81 باغ نظرگاه در قلعه -
- (82) Kan-gate leading from the Fort. 82 دروازه کن از قلعه بهکر -
- (83) House of Rai Murlidās and Murlidhar-dās, brothers, Qān-nūngōs. 83 حویلی رای مورلیداس و مورلیدرداس برادران قانونگویان -
- (84) Tomb of Khān Kāldī. 84 مقبره خان کالدی -
- (85) Mosque of Qāzī Ḥalū, in the town Rohrī. 85 مسجد قاضی حلو در قصبه لوهری -
- (86) Principal mosque in the town Lohrī, built by Ghāzī Khān. 86 مسجد جامع قصبه لوهری بذاکوده غازیکان -
- (87) House Ḥaẓrat Khwāja Khizr. 87 خانه حضرت خواجه خضر -
- (88) Boat. 88 کشتی -
- (89) House of Governor of Lohrī. 89 حویلی حاکم نشین قصبه لوهری -
- (90) Boat. 90 کشتی -
- (91) Boats which come from Multan and Lahore. 91 کشتیهایی که از ملتان و لاهور میآیند
- (92) Sarai of Mīr Muḥammad Ma'sūm, in the town of Lohrī. 92 سرای میر محمد معصوم در قصبه لوهری -
- (93) *Cabūtra* of the Police Officer, in the town Lohrī. 93 چبوترگ کوتوال قصبه لوهری -
- (94) Mosque of Mīr Sayyad Ya'qūb. 94 مسجد میر سید یعقوب -
- (95) House and Bazar belonging to Mīr Sayyad Ya'qūb. 95 حویلی و بازار سکونت میر سید یعقوب جیو -
- (96) Square of Balad Jān in the outskirt of town Lohrī. 96 میدانی بلدخان در سواد قصبه لوهری -
- (97) The great Mandir is a well-known place. 97 منده کبیر که منزل مشهور است -
- (98) The place above the town Lohrī where the large boats arriving from Ṭhaṭṭhā, Lahor, Multan, anchor. 98 میدانی بالای قصبه لوهری که کشتی ها کلان از تهته و لاهور و ملتان آمده ایستاده میشوند -
- (99) River above the town Sak-ar. 99 دریا بالای قصبه سکهر -

The following papers were read :—

1. *Tibbat 365 years ago*,—By MAJOR H. G. RAVERTY. Communicated by the Philological Secretary,

2. *Coins of the Musalman Kings of Ma'bar*,—By C. J. RODGERS, ESQ., Honorary Numismatist to the Government of India.

3. *On some Rare Muhammadan coins*,—By SURGEON-CAPTAIN W. VOST.

The papers will be published in the *Journal*, Part I.

4. *On some Indian Land Mollusca*,—By COLONEL H. H. GODWIN-AUSTEN.

The paper will be published in the *Journal*, Part II.

LIBRARY.

The following additions have been made to the Library since the meeting held in March last.

TRANSACTIONS, PROCEEDINGS, AND JOURNALS,

presented by the respective Societies and Editors.

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Buenos Aires. Academia Nacional de Ciencias en Córdoba,—Boletin, Tome XIV, No. 1.

Caen. La Société Linnéenne de Normandie,—Bulletin, Tome VIII (4^e série), Nos. 1-4.

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———. Indian Medical Gazette,—Vol. XXX, No. 3.

———. The Medical Reporter,—Vol. V, No. 6.

———. Photographic Society of India,—Journal, Vol. VIII, No. 3.

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———. Institution of Mechanical Engineers,—Proceedings, No. 3, 1894.

———. Nature,—Vol. LI, Nos. 1321-1324.

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- London. Royal Astronomical Society,—Monthly Notices, Vol. LV, Nos. 3 and 4.
- . Royal Geographical Society,—Geographical Journal, Vol. V, No. 3.
- . Royal Microscopical Society,—Journal, Part 6, 1894.
- . Royal Society,—Proceedings, Vol. LVI, No. 338.
- . Royal Statistical Society,—Journal Vol. LVII, Part 4.
- Lyon. La Société D'Agriculture Sciences et Industrie de Lyon,—Annales, 7^e série, Tome I.
- Munich. Der K. B. Akademie der Wissenschaften zu Munchen,—Sitzungsberichte, Math.-phys. cl., Heft 4, 1894.
- Mussoorie. The Indian Forester,—Vol. XXI, No. 3.
- Nantes. Société des Sciences Naturelles de L'Ouest de la France,—Bulletin, Tome IV, Nos. 2 et 3.
- New York. The Nation,—Vol. XLIV, Nos. 1140 and 1141.
- Paris. L'Académie Nationale des Sciences, Belles-Lettres et Arts de Bordeaux,—Actes, 3^e série, Tome LIV.
- . Journal Asiatique,—Tome IV (IX^e série), No. 2.
- . Musée Guimet,—Revue de L'Histoire des Religions, Tome XXIX Nos. 2 et 3.
- . Du Muséum d'Histoire Naturelle,—Nouvelles Archives, 3^e série, Tome VI.
- . Société D'Anthropologie de Paris,—Tome V (IV^e série), Nos. 2 et 3.
- . ———. Mémoires, Tome I (III^e série), No. 2.
- . Société de Géographie,—Comptes Rendus des Séances, Nos. 2-4, 1895.
- . Société Philomathique de Paris,—Comptes Rendus des Sommaires des Séances, Nos. 8 et 9, 1895.
- Philadelphia. American Academy of Political and Social Science,—Annals, Vol. V, No. 5.
- Rome. Società Degli Spettroscopisti Italiani,—Memorie, Tome XXIV, No. 1.
- St. Petersburg. Russian Imperial Geographical Society,—Proceedings, Vol. XXX, No. 5.
- Taiping. Perak Government,—Gazette, Vol. VIII, No. 7.
- Turin. La Reale Accademia della Scienze di Torino,—Memorie, 2^e série, Tome XLIV.
- Vienna. Der K. K. Geologischen Reichsanstalt,—Verhandlungen, Heft 14-18, 1894.
- . Der K. K. Zoologisch-botanischen Gesellschaft,—Verhandlungen, Band XLV, Heft 1.

Wellington. Polynesian Society,—Journal, Vol. III, No. 4.

Yokohama. Asiatic Society of Japan,—Transactions, Vol. XXII, Part 2.

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BHANDARKAR, RAMKRISHNA GOPAL. Early History of the Dekkan down to the Mahomedan Conquest. 2nd Edition. 8vo. Bombay, 1895.

UPRETI, PANDIT GANGÁ DATT. Proverbs and Folklore of Kumaun and Garhwal. 8vo. Lodiāna, 1894.

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JONKER, J. C. G. Bimaneesche Texten. 8vo. Batavia, 1894.

BATAVIAASCH GENOOTSCHAP VAN KUNSTEN EN WETENSCHAPPEN.
Report on the Nagpur Experimental Farm in the Central Provinces for the year 1893-94. Fcp. Nagpur, 1894.

CHIEF COMMISSIONER, CENTRAL PROVINCES.
The Indian Antiquary for February 1895. 4to. Bombay, 1895.
North Indian Notes and Queries for January and February 1895. 4to. Allahabad, 1895.

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Choix de Lettres D' Eugène Burnouf, 1825-1852. 8vo. Paris, 1891.

DR. A. F. R. HOERNLE.
RODGERS, C. J. Catalogue of the Coins purchased by the Government of the Punjab. Part II, Miscellaneous Muhammadan Coins. 8vo. Calcutta, 1894.

LAHORE MUSEUM.
THURSTON, Edgar. Rámésvaram Island and Fauna of the Gulf of Manaar. 8vo. Madras, 1895.

MADRAS GOVERNMENT MUSEUM.
Monthly Weather Review for November 1894. 4to. Calcutta, 1895.
Original Meteorological Observations of Calcutta, Allahabad, Lucknow, Lahore, Nagpur, Bombay, and Madras for November 1894. 4to. Calcutta, 1895.

METEOROLOGICAL REPORTER TO THE GOVERNMENT OF INDIA.
Bulletin of Miscellaneous Information, 1894. 8vo. London, 1894.

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VLOTEN, G. Van. Liber Mafâtîh Al-Olûm. 8vo. Leyden, 1895.
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 Göttingen. Der Königl. Gesellschaft der Wissenschaften,—Göttin-
 gische gelehrte Anzeigen, Nr. 12, 1894.
 ———. ———. Nachrichten, Nr. 3, 1894.
 Leipzig. Annalen der Physik und Chemie,—Band LIV, Heft 3.
 ———. ———. Beiblätter, Band XIX, Heft 2 und 3.
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 5 und 6; Supplement zu Band VII.
 ———. Messenger of Mathematics,—Vol. XXIV, No. 6.
 ———. Numismatic Chronicle,—Part 3, 1894.
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 Tome CXIX, Nos. 23–27.
 ———. Revue Critique d' Histoire et Littérature,—Tome XXXVIII,
 Nos. 49–52.
 Vienna. Vienna Oriental Journal,—Vol. VIII, No. 4.

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 ———. Hindu Practice of Medicine. 8vo. Calcutta, 1892.
 ———. Nidana, a Sanskrit system of Pathology. An English transla-
 tion with Sanskrit Passages. 8vo. Calcutta, 1892.
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 NAVILLE, EDOUARD. The Temple of Deir el Bahari. 4to. London,
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 NEWBERRY, PERCY E. El Bersheh, Part I. 4to. London, 1894.
 TAWNEY, C. H. The Kathákoça; or Treasury of Stories. Translated
 from Sanskrit Manuscripts. 8vo. London, 1895.
 VIBART, COLONEL H. M. Addiscombe: its heroes and men of note.
 8vo. Westminster, 1894
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PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR MAY, 1895.

The Monthly General Meeting of the Asiatic Society of Bengal, was held on Wednesday, the 1st May, 1895, at 9-15 P. M.

DR. A. F. RUDOLF HOERNLE, in the chair.

The following members were present :—

Dr. A. Alcock, The Hon. Mr. T. D. Beighton, J. C. Bose, Esq., Dr. G. A. Grierson, C. L. Griesbach, Esq., C. S. Middlemiss, Esq., Bābu Pañcānana Mukerjee, L. de Nicéville, Esq., Dr. F. Noetling, Surgeon Lieut.-Col. G. Ranking, P. C. Rāya, Esq., Paṇḍit Haraprasād Çāstrī.

Visitors :—Maulavie Abdus Salam, H. H. Hayden, Esq., W. Mackintosh, Esq.

The minutes of the last meeting were read and confirmed.

Thirty-seven presentations were announced, details of which are given in the Library List appended.

The following gentleman duly proposed and seconded at the last Meeting of the Society was ballotted for and elected an Ordinary Member :—

Maulavie Abdus Salam.

The following gentleman has expressed a wish to withdraw from the Society :—

E. C. Cotes, Esq.

The Council reported that there were five vacancies in the list of Honorary Members, the Council therefore recommended the four following gentlemen for election as Honorary Members at the next meeting :—

Professor Hofrath Georg Bühler, Ph.D., is at present Sanskrit Professor at the Vienna University. He was formerly a member of the Bombay Education Service, and during that period of his career laid the foundation of a reputation for accurate learning which has ever since gone on increasing. He took a prominent part in the foundation of the well-known Bombay Sanskrit series, in which many excellent editions of classical works in that language, have issued from his pen. It is owing mainly to his efforts that the admitted excellence of editions of Sanskrit works published in Bombay should be attributed. Dr. Bühler has published many articles dealing with Sanskrit and Prakrit Epigraphy in the *Indian Antiquary* and other scientific *Journals*, and is now one of the greatest living authorities on the subject. Foremost among his works in this branch of study may be mentioned his edition and translation of the Edicts of Aśoka, published in German in the *Zeitschrift des deutschen morgenländischen Gesellschaft*, and in English in *Epigraphia Indica*. In Oriental Biography, his Life of the Jain Monk, Hēmacandra, is a model of learned research combined with an interesting style. His latest works have appeared in the *Vienna Oriental Journal* under the title of *Oriental Studies*, and the last of these is a most important contribution to our knowledge of the Indian Alphabet, which he conclusively shows to be derived from that of ancient Phœnicia.

Lord Rayleigh, who is now prominently before the scientific world as the discoverer of a new gas in the atmosphere, has for many years been a leading Fellow of the Royal Society of London, to which he was admitted in 1873. He was Senior Wrangler and Smith's Prizeman in 1865 and for five years, Professor of Experimental Physics in Cambridge University. He has written many scientific papers dealing, in the earlier years, chiefly with Electricity and Sound, but latterly with a wider range of subjects. His best known work is an abstruse treatise on sound, published eighteen years ago. He has been the recipient of numerous honorary degrees from British and Foreign Universities, and is a Member or Associate of many Scientific Societies.

At the Anniversary Meeting of the Chemical Society held in March last, the Faraday Medal was presented to Lord Rayleigh for the distinguished services he has rendered to Chemical Science through the discovery of Argon.

Lieutenant-General R. Strachey, R.E., F.R.S., C.S.I., is distinguished in many branches of Science, chiefly in Physical Geography, Geology, Botany and Meteorology. He was engaged in the scientific survey of Kumaon and Garhwal in 1848, where he made valuable geological and botanical researches and collections, and wrote an account of its Physical Geography. He is the Chairman of the Meteorological Council, in which capacity he investigated the atmospheric phenomena resulting from the great earthquake at Krakatoa, some years ago. He was delegate of Great Britain at the International Prime Meridian Conference at Washington in 1884, at which Greenwich was chosen as the Prime Meridian.

He is distinguished as a Geographist, and was President of the Royal Geographical Society in 1887-89, when he delivered a course of lectures on Geography at Cambridge University, which have been since published, and he wrote the article on "Asia" in the new edition of the *Encyclopædia Britannica*.

He has received an honorary degree at Dublin and Oxford Universities.

He has written papers on a large variety of scientific subjects, and has been Vice-President of the Royal Society more than once.

Mr. C. H. Tawney, C.I.E., M.A., at present Librarian of the India Office, has distinguished himself by his researches in Sanskrit and Prakrit Literature. He has translated the *Uttara-rāma-carita* (1871), Two Centuries of Bhartṛhari (in English verse, 1877), and the *Mālavikāgnimitra* (2nd Edition, 1891). He has also contributed several papers to the *Journal* of this Society and to the *Indian Antiquary*. His translation of the *Kathā-sarit-sāgara*, &c., of Sōma-dēva, prepared for the *Bibliotheca Indica*, is a classical work which has rendered important services to students of ancient Indian civilization, and of the science of Folk-tales. The Society owes a special debt to Mr. Tawney for this most valuable work. Since his retirement to Europe and acceptance of his present post, he has added another laurel to those already earned, by translating the important work entitled the *Kathā-kōṣa* or Treasury of Stories, for the Oriental Translation Fund.

The CHAIRMAN announced that Mr. Frank Finn had been appointed a member of the Council and Anthropological Secretary of the Society.

The CHAIRMAN also announced that Dr. A. Alcock had been appointed to officiate as General Secretary in the place of Mr. C. R. Wilson, in addition to his own duties as Natural History Secretary.

Dr. A. F. Rudolf Hoernle exhibited four copper coins of Abdagases and Kadphises II. with new legends in Bactrian characters. He said:—

The two Kadphises coins are out of a lot of 422 copper coins, found recently on the Kalka-Kasauli road, in the territory of the Mahārāja of Patialā. The whole of the coins was transmitted for examination to Mr. C. J. Rodgers, Honorary Numismatist to the Government of India, in Amritsar. He found among them about 40 coins of Kanishkar of well-known types. The rest were coins of Kadphises II., all of them of the ordinary type, though of different dies, except the two, now exhibited. These two, Mr. Rodgers noticed, bore Bactrian legends on the reverse side, quite different from the usual one. He sent them down to me for confirmation. One of them undoubtedly shows an entirely different and new reading. Only one-half of the legend, on the right hand marginal semi-circle, is legible. It reads as follows:—

(*hegoḍha*)*sa* or (*hegoṣa*)*sa aprataha(tasa)*.

The portion enclosed in brackets is not quite distinct. It is quite possible that *hegoḍhasa* which seems to give no sense is really *tradatasa*. But *aprata* is perfectly distinct; and *tasa* fairly so. One would expect *apratihatasa*, and it is possible that that is really the reading, as the upper part of the apparent akshara *ta* is rather rubbed. In any case the word *apratihatasa* forms quite certainly a part of the legend, and it occurs in that place of the coin which usually shows the words *himakapiṣasa* (see Br. Mus. Cat., pl. xxv., fig. 12). The Bactrian letters of these two sets of words could not easily be mistaken for one another. The legend, therefore, on this coin, is certainly a new one. In its entirety it probably reads:—

Maharajasa rajadirajasa tradatasa apratihata.

The term *apratihata* has hitherto never been found on any of the coins of Kadphises II. It occurs, however, on the coins of Gondophares and Rañjabala, who must have been nearly contemporary with him. A variety of it also occurs on the earlier coins of Lysias, Artemidorus and Philoxenus.

With regard to the other Kadphises coin, I am not quite so certain. Nearly the whole of the Bactrian legend is obliterated. There are only three letters that admit of being read at all. They stand in the middle of the right-hand margin, near the bull's head, where ordinarily the letters of the word *himakapiṣasa* come in. They now seem to read *sa maya*, but they are slightly mutilated and rubbed; they stand exactly in the place of *himaka*, and on the whole the probability is

that they are really the remnants of that combination of letters. If this be so, this coin is one of the ordinary kind.

The Greek legend on the obverse of both coins is almost wholly obliterated. On the new coin, a trace of ΜΕΓΑΟ (*i.e.*, μέγας οὐρημο) is just recognisable near the right foot of the figure of Kadphises, in its usual place.

The two Abdagases coins are of very peculiar interest, inasmuch as they present the only instance, hitherto discovered, of Bactrian script running from the left to the right. Hitherto, as is well-known, that script has invariably been found running from the right to the left.

The two coins were found among a lot of Bactrian copper coins, procured by Mr. J. A. Bourdillon, C.S., from the Gayā bazar, in December last. The lot consisted mostly of coins of Soter Megas, Kadphises I. (*Kujula*-type), and Gondophares, with a few of Abdagases of the usual well-known types, and in the usual, much abraded condition. I picked out the best preserved specimens (purchased for 2 annas each), for Mr. Bourdillon's and my own collection, and the rest were returned to the bazar. On closer examination I discovered, among the Abdagases coins, two specimens which greatly differed in two points from the usual type of his coins. In the first place, I noticed, to my great surprise, that a portion of the Bactrian legend runs from the left to the right. In the second place, it appeared that the whole legend was (as usual on most Bactrian coins, copper as well as silver) arranged in two sections. On the ordinary copper coins of Abdagases, as well as of Gondophares, and other late kings, the legend runs continuously all round the margin, and is to be read from the inside of the coin. This, however, is not the usual arrangement on Bactrian coins. As a rule it is not written continuously, but in two sections. The smaller section of the Bactrian legend (on the reverses), giving the name, commences on the lower right of the margin, and runs, along the bottom of the coin, from right to left, to the lower left of the margin; and must be read from the outside of the coin. The larger section commences on the lower right of the margin, and runs up all round the top of the coin, down to the lower left; and must be read from the inside of the coin. Both sections, therefore, commence on the lower right of the margin, and read from the right to the left, in diverging lines. The same arrangement holds good for the Greek legends (on the obverses); only in this case, as Greek is read from the left to the right, the starting point of the two sections is the lower left of the margin. Now on our new Abdagases coins, there is a curious mixture of the Greek and Bactrian arrangements. The legend is written in two sections; the smaller section, giving the name, *Abdagaçasa*, begins on the lower right, and runs across

to the lower left, and reads from the outside of the coin, from the right to the left. This smaller section, therefore, follows the usual system of writing and reading the Bactrian script. But the larger section, commences on the left side, where the smaller section ends, and then runs, from the left to right, round the upper part of the margin, down to where the smaller section commences; and it reads from the inside of the coin. The larger section, therefore, reads from the left to the right, like the Greek. In fact, that section is arranged and reads like a Greek legend, while the smaller legend is arranged and reads like a Bactrian legend, though both sections are written in Bactrian characters. In other respects the legend is the usual one, *viz.* :—

Larger section : *Maharajasa tradatasa*

Smaller ditto : *Avadagaçasa*.

Mr. Bourdillon's specimen gives the whole of the legend, except the letters *vada* of the name; but some of the existing letters are rubbed and mutilated; the five letters *maha*, *ja* and *çasa*, however, are perfectly distinct. On my own specimen of the coin, only a very small portion of the legend is preserved; *viz.*, the letters *maha* and *gaçasa*. This portion, equally distinct on both specimens, forms, as will be understood from the arrangement, above explained, a continuous set of letters, and is made up of the beginning of the larger and the end of the smaller sections. It is quite characteristic, and sufficient to prove how the whole legend must have run, even if it is not actually extant.

Unfortunately there is not sufficient time to prepare photographic facsimiles of these four coins, before my departure on leave. But, I hope, on my return to publish facsimiles in the *Journal*, together with such further information, as may be then forthcoming.

Dr. A. F. Rudolf Hoernle exhibited a number of small fragments of Ancient Manuscripts from Central Asia. He said :—

These fragments were received by me about a month ago from the Foreign Office in Simla, to which they had been sent by Mr. G. Macartney, at Kashghar, where he acts as Special Assistant of Chinese affairs to the Resident in Kashmir. The Foreign Office letter stated that these manuscripts had been excavated in Kuchar and presented to Mr. Macartney by the Manager of the Chinese Foreign Commerce at Kashghar.

Unfortunately these fragments are the merest scraps of what was clearly a collection of several manuscripts. They are too small to be of any literary or historical value; but from the palæographic point of view they present some points of interest.

The fragments number several hundreds, and are mostly utterly useless, but there are about a hundred of the size of one to two inches square, which bear connected letters, and are legible.

The material of the fragments are of three different kinds: palm-leaf, birch-bark, and paper. The paper is of several varieties of manufacture.

The number of manuscripts, represented by these fragments, it is difficult to define with certainty. To judge from the varieties of writing and material, however, there must have been not less than eight or nine. There was certainly one manuscript of palm-leaf. There was also certainly one, if not two, of birch-bark; for the writing on the fragments seem to show two different styles of writing. Of paper manuscripts there must have been, at least, five, but probably more; this is shown by the varieties of writing and make of paper.

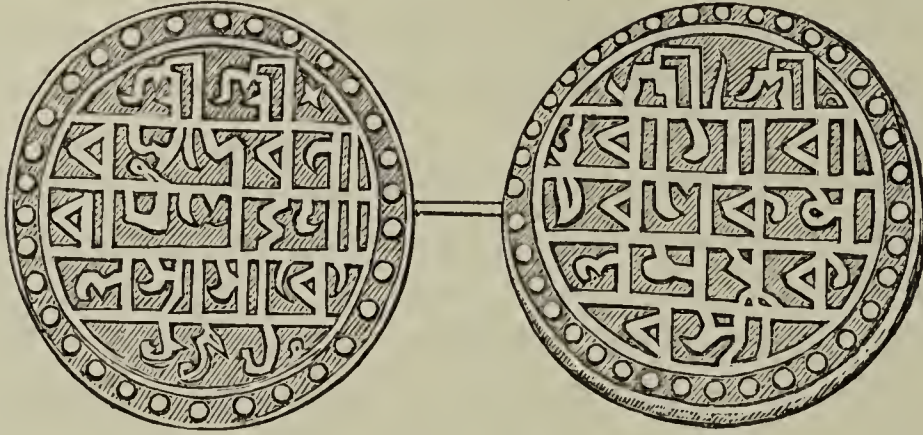
Particularly noticeable is that the palm-leaf and birch-bark fragments show a purely Indian type of writing, of the North-Western Gupta class, similar to that on the Horiuzi palm-leaf MS., and the birch-bark Bower MS. This, indeed, might have been expected from the fact that the material is palm-leaf or birch-bark, which is not obtainable in Central Asia. Manuscripts on these materials must have been prepared and introduced from India. The fact of the occurrence of them in Central Asia may be of considerable chronological value. They exhibit the old form of the tridentate *y*, and the old Gupta form of *m*. The superscript *r* is formed on the top line of writing instead of above it.

The paper manuscripts uniformly exhibit the Central Asian kind of Nāgarī, as shown in the Weber Manuscripts. But they are of considerable variety. Some approach very closely to the pure Indian type, as in Weber MS., Parts I and II (Plate I, Fig. 1, 2; in *Journal, As. Soc., Beng.*, for 1893, pp. 9, 17), others show the purest Central Asian type as in Weber MS., Parts IV to IX (*ibid.*, Pl. II, Fig. 1, 2, 3, Pl. III, Fig. 1-5). In particular, there are a few fragments, which are so strikingly like several leaves of the Weber MSS., as to suggest that they may have belonged to missing leaves of the same manuscripts. The writing that remains on the fragments, however, is too defective to allow of arriving at any more certain conclusion.

A Plate of selected specimens is being prepared by Col. Waterhouse, of the Survey of India, which, I hope to be able to publish, with additional information, in the *Journal* of the Society.

The PHILOLOGICAL SECRETARY exhibited two rare Assam coins forwarded by Mr. E. A. Gait. One is a coin of **Raghu-nārāyaṇa**, the founder of the western branch of the Koch Kings (*vide* J. A. S. B.

lxii., 292). It is most interesting as being the first specimen of a coin of this branch of the family which has come to light.

*Obverse.**Reverse.*

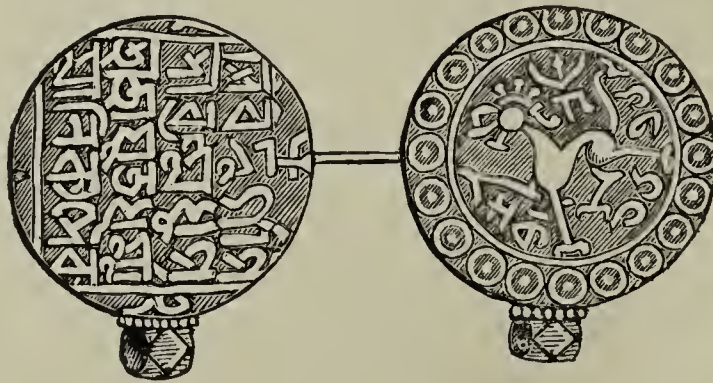
The legend is

श्री श्री
रघुदेवना
रायण पा
लस्य साके
१५१०

श्री श्री
हर-गौरी
चरण-कम
ल-मधक
रस्य

The date of the coin (Çak. 1510, corresponds to 1588 A.D. **Raghu-nārāyaṇa's** dates are 1581–1593 A.D. (l. c., p. 305), so that the coin belongs to the 7th year of his reign. The coin was the property of Bābū Tānurām, Mauzādār of Hastināpur Mauzā, in Barpēlā, who has been good enough to present it to the Society.

The second coin is of **Dharma-māṇikya-dēva** of Tippera. A very similar one is published in Marsden's *Numismata Orientalia*, p. 795, No. MCCIX. It has been presented to the Society by Mr. Gait.



The legend is as follows:—

*Obverse.**Reverse.*

शिव-दुर्गा-प
दा-रज मधुप
श्री श्री-युत धर्म
मानिक्य देव

Figure of Lion to the left.

शक १६३६

Çak. 1636 is equivalent to 1714 A.D.

The PHILOLOGICAL SECRETARY read the following note on the Chinese equivalent for Rangamātī.

In Mr. Beveridge's paper *On the Site of Karna Suvarṇa*, read at the meeting of December, 1893,¹ he identified this town, the Kie-la-na-su-fa-la-na of Hiuen Tsiang with the town of Rangamātī in the Murshidābād district. In the course of his article, Mr. Beveridge quoted Hiuen Tsiang as follows—"By the side of the capital there rises the monastery called Lo-to-wei-chi-seng-kia-lan," which last word is, according to M. Julien, the phonetic equivalent of the Raktaviti Saṅghārāma, which again Mr. Beveridge argues is the same as Rangamātī. Lo-to-wei-chi, means, in Chinese, 'red earth,' and cliffs or bluffs of red clay form a prominent feature in the scenery of Rangamātī. He suggests that instead of Raktaviti, the Sanskrit equivalent should be Rāgamṛttikā, or Raktamṛttikā, the latter portion of the compound, *mṛttika* being the equivalent of the Chinese *wei-chi*. He further points out that in Hiuen Tsiang's life, the word is Ki-to-mo-chi, instead of the Lo-to-wei-chi of the travels, and suggests that this difference of reading may lead to a settlement of the question. *Mo-chi* may be right, and may be the equivalent of *mṛtti*.

Some time ago, I had the fortunate opportunity of submitting the point for the opinion of M. Sylvain Lévi, perhaps the only person in the world capable of deciding it, for he is equally competent a scholar of Sanskrit and of Chinese. He very kindly writes as follows,—

'The difference between the two words *Ki-to-mo-chi*, of the Life, and *Lo-to-wei-chi*, of the *Si-yu-ki*, is simply due to the confusion of two graphic signs nearly identical. The syllable *Lo* (𠂔 𠂔_p) of the *Si-yu-ki* very closely resembles the character *Ki* (𠂔 𠂔_p) of the Life, the only difference being that the character which surmounts the (𠂔), is (𠂔) in one case, and (𠂔) in the other. Similarly with regard to the character *wei* (𠂔) which only differs in the arrangement of its two horizontal lines from the character *mo* (𠂔). In the former, the shorter line is written above the longer, and in the latter, the reverse is the case.'

'The reading *Lo* is the more probable, for Julien, in his *Méthode*, cites no example of the character *Ki* occurring in the transcription of Sanskrit names, nor have I ever met an instance. On the other hand, for the same reason, the character *mo* is more probable than *wei*. The regular transcription of *Lo-to-mo-chi* would be a Prakrit from *Rattamati*[kā], the equivalent of the Sanskrit *Rakta-mṛttikā* which corresponds to the meaning "Red clay" given to the convent by the Pilgrim.'

¹ Journal, Vol. LXII. Pt. I for 1893. pp. 315 and ff.

This settles the question, and we are all much indebted to M. Sylvain Lévi, for his very interesting communication.

Dr. G. A. Grierson, Honorary Philological Secretary, read the following note on an early supposed Bangālī version of the Lord's Prayer.

At the meeting of the Society held in April 1893, I had the honour of reading a paper on the *Early Study of Indian Vernaculars in Europe*.¹ It was fortunate enough to attract the attention of other scholars, some of whom have made valuable additions to our knowledge of the subject. Amongst these latter may be mentioned a paper read last January before the Reale Accademia dei Lincei of Rome, by Signor Emilio Teza, entitled, *Dei primi Studi sulle Lingue indostaniche alle note di G. A. Grierson*. Signor Teza has brought the following interesting facts to light.

In my paper I drew attention to a work of Fritz published in 1748, entitled the *Orientalisch-und-occidentalisch Sprachmeister*, which contained amongst other things two hundred translations of the Lord's Prayer in different languages. Regarding the Bangālī version given in that work, I said² :—

The Bangālī translation, which is taken from Wilkins' sample given in Chamberlayne's *Sylloge*, is almost worth reprinting as a curiosity for the number of seemingly impossible mistakes it contains. In fact it is quite illegible and unintelligible to every native of Bengal to whom I have shown it. It has evidently been made by some person who got a copy of the alphabet, and a general description of the language, and then 'greatly dared.' Even his knowledge of the alphabet is incomplete.

Signor Teza is the fortunate possessor of a copy of Chamberlayne's *Sylloge*, from which Fritz copied his Bangālī version, and Wilkins' confession in the Latin Preface to that work clears up the mystery. He says that as he had not been able to obtain a copy of the Lord's Prayer in Bangālī, he had taken a Malay version, and written it in Bangālī characters. The transliteration given by Wilkins of this curiosity is as follows :—

Bappa kita, jang adda de surga,
 Namma-mou jadi bersakti,
 Radjat-mou mendarang,
 Kandhatimou menjadi de bumi sepertj de surga,
 Roti kita derri sa hari-hari membrikan kita sa hari inila,
 Makka ber-ampunla padakita doosa kita, seperti kitá ber-ampun-akan siapa bersala kapada kita,
 D'jang-an hentar kita kapada tjobahan,
 Tempi lepaskan kita dari jang d'jakat :

¹ See *Journal*, Part I. for 1893, p. 41.

² L. c., p. 48.

Karna mou pun'ja radjat daan kauwassahan daan ber-bessaran
sampey kakakal. Amin.

It appears according to Signor Teza, that the above is actually Malay.

The version in so-called Bangālī characters, of which the above is Wilkins' transcription is now worth reprinting,—for as a matter of fact only a few of the characters are Bangālī, and those few are wrongly used. Thus *de* is written দ instead of ঢ. It is either an absolute invention of Wilkins, which is not probable, or it is some hybrid character used by Malay Sailors in their intercourse with Bengal. Wilkins was under the impression that, at the time when he wrote (1715 A.D.), Bangālī was disappearing as a language, its place being taken by Malay.

বসন্তমণি তবিলি দিগন্তে অসম্মান পূৰ্ণ হুইয়াছেঃ

কলহমণি পক্ষি দিগন্তে অসম্মান হুইয়াছেঃ

বসন্তমণি পক্ষি দিগন্তে অসম্মান হুইয়াছেঃ

তবিলি দিগন্তে পক্ষি দিগন্তে অসম্মান হুইয়াছেঃ

অসম্মান দিগন্তে পক্ষি দিগন্তে অসম্মান হুইয়াছেঃ

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তবিলি দিগন্তে পক্ষি দিগন্তে অসম্মান হুইয়াছেঃ

দিগন্তে পক্ষি দিগন্তে অসম্মান হুইয়াছেঃ

তবিলি দিগন্তে পক্ষি দিগন্তে অসম্মান হুইয়াছেঃ

দিগন্তে পক্ষি দিগন্তে অসম্মান হুইয়াছেঃ

অসম্মান দিগন্তে পক্ষি দিগন্তে অসম্মান হুইয়াছেঃ

অসম্মান হুইয়াছেঃ

Another correction has been made by Signor Teza, to which I take this opportunity of drawing attention. In my article ¹ I mentioned that the first grammar of Hindūstānī was that of Schultz, published in 1745, a work which I had not had the good fortune to see. Signor Teza is the fortunate possessor of a copy of this work, which appeared in Halle in 1744 (not 1745). Schultz, in his preface, mentions a still earlier grammar. In 1743 there appeared the *Miscellanea Orientalia* of David

¹ L. c., p. 47.

Millius, in which was inserted a grammar of the Hindūstānī language composed by John Joshua Ketelaer, for some time Ambassador of the Dutch East India Company, to the Great Mogol, at Agra. Ketelaer's Hindūstānī version of the Lord's Prayer is given by Signor Teza and will bear reprinting as a curiosity. It runs—

Hammare baab—Ke who asmaanmehe—Paak hoeé teere naom—Auwe hamko moluk teera—Hoé resja teera—Sjon asmaan ton sjimienme—Rootie hammare nethi hamkon aasde—Oor maafkaar taxier apne hamko—Sjon mafkarte apre karresdaar onkon—Nedaal hamko is was wasjeme—Belk hamko ghaskar is boerayse. Teeræ he patsjayi, soorrauri alemgiere heamet-me. Ammen.

I owe to the courtesy of Mr. W. Irvine, the following information about Ketelaer. He was accredited to Shāh 'Ālam Bahādur Shāh (1708–1712) and Jahāndār Shāh (1712). In 1711 he was the Dutch Company's Director of Trade at Surat. He passed through Agra both going to and coming from Lahore (*via* Delhi), but there does not seem to be any evidence available that he ever *lived* there, though the Dutch Company had a factory in that city subordinate to Surat. The Mission arrived near Lahore on the 10th December 1711, returned to Delhi with Jahāndār Shāh, and finally started from that place on the 14th October 1712, reaching Agra on the 20th October. From Agra they returned to Surat. A detailed account of the Embassy, [taken from a diary kept by one Ernst Coenraad Graaf, first sworn clerk to the Embassy, will be found in F. Valentijn's *Oud en Nieuw Oost Indien*, Vol. IV. (Ed. 1726), pp. 282–302. Some further particulars concerning Ketelaer will be found in *Ost Indien und Per-sianische Reisen, von Johann Gottlieb Worms, Aus Döbeln , oder , aus Licht gestellt durch M. Crispinum Weisen Past. Zu. Mochau*, 1st Ed. Dresden 1737; 2nd Ed. Leipzig 1745, 8vo. From this¹ we learn that Ketelaer was also called Kötelär, Kessler, or Kettler, and that he was a Lutheran born at Elbingen in Prussia. In 1716 he had been three years Director for the Dutch Company at Surat. He was then appointed their envoy to Persia and left Batavia in July 1716, having been 30 years in the Dutch Service, or in the East Indies. He was a heavy corpulent man, and died of fever at Gambroon on the Persian Gulf on his return from Isfahān, after having been two days under arrest, because he would not order a Dutch ship to act under the Persian Governor's orders against some Arab invaders.

I take this opportunity of drawing attention to some early works on Indian languages which have come to my notice since I wrote

¹ Second Ed., pp. 22, 247, 248, 303.

my article. Father Heinrich Roth, S. J., attached to the Goa Mission¹ journeyed from Goa to Agra about 1650–1660. About 1665 he returned to Rome, and drew up for Athanasius Kircher, S. J., five plates for the latter's *China Illustrata* (published at Amsterdam in 1667). The first four of these plates contain the alphabet and elements (in the Dēvanāgarī character) of Sanskrit, explained in Latin, and the fifth Our Lord's Prayer and an Ave Maria in Sanskrit and Latin, to serve as an exercise for beginners. According to Constable, these are the first specimens of Sanskrit ever printed or engraved (as for a book) in Europe, or indeed anywhere.

Abraham Roger was the first Dutch Chaplain (1631–1641)² at Pulicat. He died at Gouda in Holland in 1649. In 1670, his widow published a work by him entitled, '*La Porte ouverte, pour parvenir à la Connaissance du Paganisme caché.*'³ On pp. 29 & ff. of this book there is printed a Dutch translation of Bhartṛhari's Ṣatakas made by a Brāhman named Padmanābha the first translation from Sanskrit published in any European language.

Finally I may refer the reader to the Hindūstānī translation of the Acts of the Apostles, dated 1748, to which attention was drawn by Mr. W. Irvine in the *Proceedings* of the Society for Decr. 1893, pp. 174 & ff.

The following papers were read :—

1. *On the Dōgām Mint.*—By SURGEON-CAPTAIN W. VOST, *Indian Medical Service.*

The paper will be published in the *Journal*, Part I.

2. *On Polarisation of Electric Ray by Double Refracting Crystals.*—By PROFESSOR J. C. BOSE, B.A. (CANTAB), B. SC. (LOND.).

(Abstract).

The following investigations were undertaken by the author to find out natural substances which would polarise the Electric Ray. In the present paper the author gives an account of the polarising action of certain crystals on the transmitted ray.

The apparatus used consisted of an Electric Radiation emitting Electro-magnetic Radiation of short wave length, a Polariser, an Analyser and a Receiver responding to incident radiation.

The Polariser and Analyser are adjusted in a crossed position, and

¹ See Constable's Edition of Bernier's travels, pp. 329 n., 332 n.

² Constable's Bernier, p. 334 n. Preface to Bohlen's Bhartṛhari, p. xii. and elsewhere.

³ Amsterdam, Jean Schipper, 1670.

the crystal to be examined is then interposed. In certain positions the crystal brightens the dark field.

Crystals belonging to the Tetragonal, Hexagonal, Rhombic, Monoclinic and Triclinic systems were found to polarise the Electric Ray.

The effect produced by the following crystals were especially marked:—Beryl, Apatite, Brucite, Barite, Microcline.

A detailed account of the apparatus used and the results obtained will be published in the *Journal*.

The paper will be published, in full, in the *Journal*, Part II.

3. *Materials for a Carcinological Fauna of India, No. 1. The Brachyura Oxyrhyncha.*—By A. ALCOCK, M. B., C. M. Z. S., Superintendent of the Indian Museum.

The paper will be published in the *Journal*, Part II.

LIBRARY.

The following additions have been made to the Library since the Meeting held in April last:—

TRANSACTIONS, PROCEEDINGS, AND JOURNALS,

presented by the respective Societies and Editors.

Baltimore. Johns Hopkins University, —Circulars, Vol. XIV, No. 117.

Batavia. Bataviaasch Genootschap van Kunsten en Wetenschappen, —
Notulen, Deel XXXII, Nr. 4.

———. Tijdschrift voor Indische Taal-, Land-en Volkenkunde,
Deel XXXVIII, Nr. 4.

Berlin. Der Gesellschaft Naturforschender Freunde zu Berlin, —
Sitzungs-berichte, Jahrgang, 1894.

Bombay. The Indian Antiquary, —Vol. XXIV, Part 298.

Bordeaux. Société Linnéenne de Bordeaux—Catalogue de la Bibliothèque, Fascicule 1 .

Calcutta. Geological Survey of India, —Records, Vol. XXVIII, Part 1.

———. Indian Engineering, —Vol. XVII, Nos. 14-17; and Index to
Vol. XVI.

———. Maha-bodhi Society, —Journal, Vol. III, No. 12.

———. The Medical Reporter—Vol. V, Nos. 7 and 8.

———. Microscopical Society of Calcutta, —Bulletin. Vol. IV,
Nos. 2-4.

———. Photographic Society of India, —Journal, Vol. VIII, No. 4.

- Dresden. Gesellschaft Iris zu Dresden,—Deutsche Entomologische Zeitschrift, Band VII, Heft 1 und 2.
- Florence. Società Africana d'Italia,—Bullettino, Tome II (2^e série), Fascicolo 5^o 8^o.
- The Hague. Koninklijk Instituut voor de Taal-, Land-en Volkenkunde van Nederlandsch-Indië,—Bijdragen tot de Taal-, Land-en Volkenkunde van Nederlandsch-Indië, 6^e Volgr, Deel I, Nr. 1.
- Hamburg. Naturwissenschaftlichen Verein in Hamburg,—Abhandlungen aus dem Gebiete der Naturwissenschaften, Band XIII.
- . ———. Verhandlungen, 1894.
- Havre. Société de Géographie Commerciale du Havre,—Bulletin, Janvier-Février, 1895.
- Leipzig. Der Königl Sächsischen Gesellschaft der Wissenschaften,—Abhandlungen, Math.-Phys. cl., Band XXI, Nrn. 3-5.
- London. The Academy,—Nos. 1194-97.
- . The Athenæum—Nos. 3517-20.
- . Institution of Electrical Engineers,—List of Officers and Members corrected to January 31st, 1895.
- . Nature,—Vol. LI, Nos. 1325-28.
- . Royal Astronomical Society,—Monthly Notices, Vol. LV, No. 5.
- . Royal Geographical Society,—Geographical Journal, Vol. V, No. 4.
- . Zoological Society of London,—Proceedings, Part 4, 1894.
- . ———. Transactions, Vol. XIII, Part 10.
- Manchester. Manchester Literary and Philosophical Society,—Memoirs and Proceedings, Vol. IX (4th Series), No. 2.
- Moscow. La Société Impériale des Naturalistes de Moscou,—Bulletin, No. 4, 1894.
- Paris. Museum d'Histoire Naturelle,—Bulletin, Nos. 1 et 2, 1895.
- . Société de Géographie,—Comptes Rendus des Séances, Nos. 5 et 6, 1895.
- . Société Philomathique de Paris,—Bulletin, Tome VI (8^e Série), Nos. 3 et 4.
- . ———. Comptes Rendus Sommaire des Séances, Nos. 10 et 11, 1895.
- Rome. Società Degli Spettroscopisti Italiani,—Memorie, Tome XXIV, No. 2.
- St. Petersburg. Der Russisch-Kaiserlichen Mineralogischen Gesellschaft zu St. Petersburg,—Verhandlungen, Band XXXI.
- Sydney. Linnean Society of New South Wales,—Proceedings, Vol. IX, Parts 3 and 4.

Taiping. Perak Government,—Gazette, Vol. VIII, Nos. 8 and 9.

Vienna. Der K. K. Geologischen Reichsanstalt,—Verhandlungen, Nrn. 1-3, 1895.

———. Der K. K. Zoologisch-botanischen Gesellschaft in Wien,—Verhandlungen, Band XLV, Heft 2 und 3.

Zurich. Der Naturforschenden Gesellschaft in Zürich,—Vierteljahrschrift, Jahrg XL, Heft 1.

BOOKS AND PAMPHLETS,

presented by the Authors, Translators, &c.

HAFFKINE, W. M. Anti-Choleraic Inoculations in India. 8vo. Calcutta, 1895.

JANET, CH. Sur L'Anatomie du Pétiole. 8vo. Paris, 1894.

———. Sur la morphologie du squelette des segments post-thoraciques chez les Myrmicides. 8vo. Beauvais, 1894.

JANET. Sur le système glandulaire des Fourmis. 4to. Paris, 1894.

JANET. Sur les nids de la Vespa crabro L. 4to. Paris, 1894.

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PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR JUNE, 1895.

The Monthly General Meeting of the Asiatic Society of Bengal, was held on Wednesday, the 5th June, 1895, at 9-15 P.M.

DR. G. A. GRIERSON, C.I.E., in the chair.

The following members were present:—

Dr. A. Alcock, Dr. R. Anderson, A. Caspersz, Esq., F. Finn, Esq., A. Hogg, Esq., The Rev. H. B. Hyde, Surgeon-Lieut.-Col. G. Ranking.

The minutes of the last meeting were read and confirmed.

Twenty-nine presentations were announced, details of which are given in the Library List appended.

The following gentlemen proposed by the Council at the last meeting were ballotted for and elected Honorary members:—

General R. Strachey.

The Right Honorable Lord Rayleigh.

C. H. Tawney, Esq.

Prof. Hofrath Georg Bühler.

The following gentlemen are candidates for election at the next meeting:—

N. D. Beatson-Bell, Esq., I.C.S., Comillah, proposed by Dr. G. A. Grierson, seconded by Surgeon-Lieut.-Col. G. Ranking.

N. Bonham-Carter, Esq., I.C.S., Calcutta, proposed by Dr. G. A. Grierson, seconded by Dr. A. Alcock.

H. D. Carey, Esq., I.C.S., Serajganj, proposed by Dr. G. A. Grierson, seconded by Surgeon-Lieut.-Col. G. Ranking.

R. W. Carlyle, Esq., I.C.S., Comillah, proposed by Dr. G. A. Grierson, seconded by Surgeon-Lieut.-Col. G. Ranking.

J. G. Cumming, Esq., I.C.S., Comillah, proposed by Dr. G. A. Grierson, seconded by Surgeon-Lieut.-Col. G. Ranking.

J. G. Monohan, Esq., I.C.S., Sibsagar, proposed by Dr. G. A. Grierson, seconded by Surgeon-Lieut.-Col. G. Ranking.

C. E. A. W. Oldham, Esq., I.C.S., Calcutta, proposed by C. L. Griesbach, Esq., seconded by Dr. G. A. Grierson.

A. F. Steinberg, Esq., I.C.S., Rangpur, proposed by Dr. G. A. Grierson, seconded by Surgeon-Lieut.-Col. G. Ranking.

P. J. Melitus, Esq., I.C.S., Shillong, proposed by Dr. G. A. Grierson, seconded by Surgeon-Lieut.-Col. G. Ranking.

Surgeon-Major L. A. Waddell (for Re-election), proposed by Dr. G. A. Grierson, seconded by Surgeon-Lieut.-Col. G. Ranking.

The following gentleman has expressed a wish to withdraw from the Society :—

P. Sundaram Pillay, Esq.

The Secretary reported the death of the following member :—

The Rev. D. G. Latham-Browne.

The Chairman announced that Mr. Frank Finn had been appointed to officiate as Natural History and Anthropological Secretaries of the Society; and Surgeon-Lieut.-Col. G. S. A. Ranking as General Secretary.

The following note by Mr. E. A. Gait on Historical Research in Assam is republished in the Proceedings, for the information of members of the Society.

By Order of Council,

G. A. GRIERSON,

Hon. Phil. Secretary.

Historical Research in Assam.

The sources of information regarding the past history of Assam
Sources of information. may be classed under the following heads :

(1) Information recorded at the time on coins and inscriptions on temples, rocks, &c.

(2) Historical documents drawn up at or about the period to which they relate.

(3) *Quasi*-historical *puthis* written long after the events with which they deal.

(4) Stray historical references in religious works.

(5) Traditions unwritten, but still current amongst the people.

I will deal with each of these sources of information separately.

Coins.

2 We know the coins of the following dynasties :

(a) Āhōm kings.	|	(c) Kings of Jaintia.
(b) Koch „	|	(d) „ „ Manipur.

(e) Kings of Tippera.

In the *Varaṇṣāvali* of Lakṣmī Nārāyaṇ, it is stated that the king of Khairam had a mint, but no coins of his have yet come to light. It is not improbable that the Khyen kings, who preceded the Koch, also coined money, but here again we have at present no definite knowledge ; nor do we know anything about the coinage of the kings of Cachar.

3. The Āhōm coins, which are octagonal in shape, are of two classes : those inscribed with the old Āhōm character, and those on which the characters are a kind of modern Nāgarī. Coins of the second class are well known ; many of them have been described by Marsden, and large numbers can still be obtained. In regard to them, all that seems to be needed is to catalogue all known coins with their inscriptions and dates, and to examine as many private collections as possible and describe all not already mentioned in Marsden or other numismatical works. The other class of coins, on the other hand, requires a good deal more attention. Until recently, when some *deodhais* deciphered one for me, none of these coins had been read. The Asiatic Society of Bengal now propose to send up all the coins of this class in their collection for examination and decipherment, but I do not yet know how many they have got. Moreover, as they have been collected without reference to their (unknown) mintage, it is doubtful how far they are representative of the different monarchs in whose reigns such coins were struck. After we have obtained readings of the Asiatic Society's coins, I think we should at once institute a search for the coins of any kings not found in the Society's collection. Of the two coins of which I have obtained

readings, one relates to Chuklenmung*

* The reading of this coin has been sent to the Society.

(1539 A.D.—1552 A.D.), and the other to Chupātphā, *alias* Gadādhara Simha

(1681—1695 A.D.). The latter must be one of the last coins struck in

the old character, as in the reign of the next king, Rudra Simha,* we have many coins struck in the Nāgarī

* Although it was not until the reign of his son that the Āhōm kings became regular Hindus, it was Rudra Simha who took the first step in this direction by importing Kṛṣṇa Rām Bhattācārjī, a Çākta Gosāin, from Nadia. The adoption of the Hindu character on the coins seems thus to have been one of the outward and visible signs of the growing influence of Hinduism.

character. The former may or may not be one of the earliest: in the *buranji* of Kāçī Nāth Tāmuli Phukan the coinage of the Āhōms is said to have commenced two reigns later, in the days of Chuchengpha, who came to the throne in 1611 A.D., and is attributed to the civilising influence of Sundar Gosāin and others who had been taken to the Koch capital as hostages by

Silārāi, and who were released and returned home during Chuchengpha's reign. Even if the first coinage was in Chuklenmung's reign, we have still fourteen rulers in the period during which the first class of coins was minted.

4. The coins of the Koch kings are not so well known, and every effort should, I think, be made to add to

† Marsden reads the dates as 1649 and 1666, but Dr. Hoernle agrees with me that the symbol reads as 6 is really a 5 when used in the coins of the Āhōm, Koch, and Tippera kings.

the number which have been described up to date. In marked contrast to the number of Āhōm coins in his collection, Marsden describes only two Koch coins, one of Lakṣmī Nārāyaṇ, dated 1549

Sak, and one of Prāṇ Nārāyaṇ, dated 1555 *Sak*.† In the addition to these, we have a coin of Nar Nārāyaṇ, dated 1477 *Sak*, which was found in the Gārō Hills., and was described in the *Journal* of the Asiatic Society of Bengal for 1875, and another of Lakṣmī Nārāyaṇ, dated 1509 *Sak*, which was obtained for me

‡ See *Proceedings*, Asiatic Society of Bengal, August 1893.

by Babu M. C. Bardalai.‡ The same Babu also procured for me two smaller

coins of this dynasty,‡ but the names of the kings is not very clear on these. Marsden printed a similar small coin (MCCXVIII), under the head "Uncertain."

The above meagre collections, so far as I know, constitutes all that we know of the Koch kings' coinage. We should, I think, do all that we can to add to it, as the matter is one not merely of numismatic interest, but is also of importance as helping us to fix the otherwise rather uncertain dates of some of the kings of this dynasty. That a systematic search would add to the number of known coins is shown by the fact that the three coins procured for me by Babu M. C. Bardalai were obtained by him after a very short enquiry.¹

¹ [Since the above was written two valuable papers on Kōch and Āhōm coins have been received from Mr. Gait, and will duly appear in the *Journal* of the Society. Ed.]

5. A search for Jaintia coins would apparently be less fruitful, as all which I have yet seen (save those of the last ruler) bear the same inscription, viz., “*Çrī Çrī Jāyantapur Purandarasya.*” No king is mentioned on these coins. The dates of the coins which I have seen are 1630, 1653, 1696, and 1704 *Sak*.

6. I know very little of the Manipur coins, which were square in shape. Perhaps the Political Agent might be able to make a collection. As regards Tippera coins, it may be observed that these do not directly concern us. They are, however, indirectly of interest as confirming or contradicting the dates given in the *Rājmaṇḍala*, or Chronicles of the Kings of Tippera, in which some references are made to the rulers of Cachar or Hiramba, and as relating to a race which we know to be closely allied to our Kachāris, Morāns, &c., and a country which the chronicles of the Mungkong Shāns mention as having been conquered by a section of that race many hundred years ago.

I may mention here that it seems highly probable that many finds of coins occur, which are never reported. Last year, I addressed the Agent and Chief Engineer, Assam-Bengal Railway, on the subject, and, after adverting to the provisions of the Treasure Trove Act, drew attention to the great importance of securing the examination by competent authority of all coins found. A circular was issued by the Agent on the subject, but from what I have since heard, it seems doubtful whether very great attention has been paid to it.

7. The next source of information are
Inscriptions. inscriptions. These again may be classified as—

- (a) inscriptions on copper plates;
- (b) inscriptions on temples built by Koch kings;
- (c) inscriptions on temples built by the Āhōms;
- (d) other inscriptions.

8. Of the copper plates yet discovered, the most important are

* *Journal of the Asiatic Society of Bengal*, IX, page 766.

† Supplement to *Pandit* for February, 1893.

‡ *Proceedings*, Asiatic Society of Bengal, 1880, page 141. These plates were brought to notice by Mr. Luttmann-Johnson, who was at that time Deputy Commissioner, Sylhet.

those of Vanamāla* and Kumāra Pāla,† which tell us something of old rulers in the Brahmaputra Valley; and the two discovered some years ago in Sylhet, which tell of the ancestors of Gaur Gobind, the Hindu king who was defeated by Shah Jalāl.‡

Other plates contain land grants by Āhōm kings, and are of use for the same purpose as the inscriptions on temples built by the Āhōms, to which reference will be made below.

I am told that there are in existence copper plates of land grants by the kings of Jaintia. These would

* The search for old inscriptions which was instituted in Colonel Keatinge's time seems to have been less thorough in Sylhet than elsewhere, and more is, therefore, to be hoped for from further enquiries now.

be of greater value than those of the Āhōms, as Jaintia is one of the old kingdoms of which our knowledge is at present most fragmentary. It is not improbable that other local rulers in the Surma Valley made grants of land on

copper plates; and it would probably bring some useful information to light if a systematic enquiry were instituted in that district into the origin of the *lākhirāj* grants there. The proceedings under the old Resumption Regulation of 1819 would probably show where further enquiry would be useful.*

A few older plates may also from time to time come to light; but their discovery must apparently be a matter of chance rather than of systematic enquiry.

9. Two useful inscriptions on temples built by Koch kings are known, *viz.*, those at Hājō and Kāmākhyā;† others may perhaps be included amongst the inscriptions noticed below as not yet deciphered.

† See my paper on the Koch Kings of Kāmarūpa, *Journal of the Asiatic Society of Bengal*, 1893, page 295.

10. There are numerous inscriptions on temples erected under Āhōm auspices. All of these bear dates of the reign of Rudra Simha (1695-1714 A.D.) and subsequent kings, and are of use chiefly in checking the dates given in the *buranjis*, and in showing the extent of country ruled by the princes in question, and the degree to which they were dominated by Hindu influences. Most of the inscriptions of this class were copied under Colonel Keatinge's auspices, and all that remains to be done is to collate these copies and see what additions to our existing knowledge of Āhōm history and chronology can be derived from them.

11. Amongst "Other inscriptions" may be mentioned two on rocks on the bank of the Brahmaputra near Tezpur, which have never yet attracted the attention which they seem to deserve, a deciphered inscription at Khāspur and another undeciphered at Maibong, and two inscriptions which were said to be undecipherable in the enquiries made in Colonel Keatinge's time, *viz.*, one on the door of the Siddhēçvara temple in Sarubangsar mauza in Kāmrūp, and another on the temple of Chaṇḍikā in the same district. No doubt further search would bring other inscriptions to light; I think that ruined palaces, such as that of Bhishmaka near Sadiya, of Hārmāti in North Lakhimpur and of Bhāluka at Bhālukupung, and the old Kachārī capitals at Dimápur, Maibong,

and Khāspur, &c., might be more carefully examined than they have yet been, and that ruined temples, such as the one on the hill at Silglát, might also receive some attention. We have not yet, I think, given to these ruins the attention which they deserve.

12. Excluding the State archives in Manipur, the only historical documents which I am acquainted with are

Historical documents.

* The Gōramur Gosāin told me last cold weather that he had a *buranji* which was taken away by Mr. Stack for examination, and was never returned to him.

those of the *deodhais* of Sibsāgar. There may be a few with the Gosāins of the Mājuli,* and the high families of State are also said to have kept private *buranjis*, some of which are doubtless still in existence. The *deodhais'* *buranjis* were examined by Kāçī Nāth Tāmuli Phukan in connection with the *Āsām Buranji* compiled by him. My proposals for their transcription and translation will be found further on.

13. Of the works of a *quasi*-historical nature, the most important

Quasi-historical writings.

by far is the *Vaṁçāvali* of Rājā Lakṣmī Nārāyaṇ, which contributed a large portion of the matter contained in my paper on the Koch Kings. Rājā Prasiddha Nārāyaṇ has also a *Vaṁçāvali*, which, however, is much more brief and less reliable. Neither of these were written at the time, but both were composed while kings of the Koch dynasty were on the throne, when the events which transpired in early reigns may be thought to have been still fresh in the minds of the people.

There are doubtless other similar works, but my knowledge of them is limited. The Kumāra Harāṇa, which deals with the conflict between Kṛṣṇa and Bān Rājā, is almost, if not quite, mythical, and the incident is taken almost in its entirety from the Bhāgavata Purāṇa. The interest attaching to this work lies chiefly in the peculiar old Assamese in which it is written (*e. g.*, ভইল instead of হল, &c.), and it is of no great value for our present purpose. It has, however, been printed (long ago) in *puthi* form, and it would be as well to acquire a copy if this could be done for a reasonable price. A more interesting work is that known as “Arimatta’s *puthi*,” in which Sankar Deb is supposed to recite to the Koch King Nar Nārāyaṇ, the history of ancient rulers in the province, including that of Arimatta and of the Bāro Bhuiyās.

I saw a copy on paper of this *puthi* recently, but am told that there is a very much more ancient copy on *sācī* bark in the possession of Sis-huram Mauzadār of Bangfang in North Lakhimpur.

Enquiries might be made with advantage with a view to finding out what other *puthis* are in existence. It is quite possible that there may

be *Vamçāvalis* in the possession of the Rājās of Beltōlā, Dimuria, Rāni, and Luki, and that much historical information might be obtained from the records of the Barpeta *sattrā* and the *sattrā* of Upper Assam.

Some of the old Musalman families of Sylhet may have records which would help us to learn something of the history of that district during Muhammadan rule.

14. Of historical references in religious writings, there are two kinds. First, there are the old traditions
References in religious works. of the *Yōginī Tantra*, the *Viṣṇu Purāṇa*, and similar works; and secondly, there are the writings of the religious revival inaugurated by Sankar Deb, such as the *Guru Caritra* and *Saṅkar Dēbar Jīban-caritra*. To the former kind we are indebted for most of what is known of the country prior to the Khyen kings, while from the latter we learn about the advent of the Bārō Bhuiyās, and gather sundry contemporaneous references to Musalman invasions, &c. Some of these works have been printed.

15. Lastly, we come to the still unwritten traditions of the people.
Traditions. It is doubtful how far these will serve our purpose, but there is no doubt that they will sometimes be of use. Thus, I have been given a list of 21 Jaintia kings, whose names have been handed down by tradition. Of these, the 7th and 8th are mentioned in the *Āsām Buranji* as father and son, and as having reigned sometime between 1611 and 1649 A.D.; and the 15th as having reigned sometime between 1695 and 1714 A.D.; the 20th, we know, died in 1832. So far, therefore, as can be judged from these outside references, the traditional names and order of reigning of the Jaintia kings may be relied upon as correct.

The Chutiyas similarly may have some traditions which would help us. We know from Āhōm sources that their *deoris* were worshipping at the copper temple at Sadiya 400 years ago, and it would be strange if they could not tell us something of the time when their own rājās ruled the country prior to their subjugation by the Āhōms.

16. I have detailed above the different sources of information from which, so far as I can see, we are
Action to be taken now. likely to be able to collect information regarding the ancient history of Assam. The action which we should now proceed to take is noted below:

Coins—

- (1) Old Āhōm coins to be read, and a search to be made for the coins of kings not yet collected.

- (2) A complete catalogue to be made of later Ahōm coins, and any new ones not in the list thus made to be acquired.
- (3) A thorough search to be made for coins of the Koch kings and earlier dynasties, if any such can be found.
- (4) A collection and description of Manipuri coins to be undertaken under the auspices of the Political Agent, Manipur.

Inscriptions—

- (5) A search to be made for copper plate grants by Jaintia and other Sylhet rulers.
- (6) Āhōm land grant plates to be collated.
- (7) Āhōm temple inscriptions to be collated.
- (8) Inscriptions on rocks at Tezpur, on the Siddhēçvara and Chaṇḍikā temples, and at Maibong to be photographed, and rubbings of the same to be taken and sent to some competent scholar for decipherment.

Historical documents—

- (9) The Manipur State records to be copied and translated. [This work might perhaps be undertaken under the supervision of the Superintendent of the State.]
- (10) The Āhōm historical *puthis* to be copied and translated.
- (11) A thorough search to be made for other historical documents.

Quasi-historical writings—

* I already have a rough translation.

(12) *Vaṃçāvali* of Lakṣmī Nārāyaṇ to be copied and translated.*

- (13) *Vaṃçāvali* of Prasiddha Nārāyaṇ to be copied and translated.
- (14) Arimatta's *puthi* to be copied and translated.
- (15) A copy of the *Kumāra-haraṇa* to be purchased, if available.
- (16) A search to be made for other similar documents, and a catalogue of those found to be made in the same form as that adopted in Bengal by the Asiatic Society.

Religious Works—

- (17) Copies to be purchased of all old Assamese religious works which have been printed.
- (18) A search to be made in the libraries of the *sattras* with a view to ascertaining if they contain any historical matter.

Traditions—

- (19) Traditions to be recorded whenever heard of.

17. Of the above, it seems to me that action is most urgently called for in regard to the decipherment of coins in the old Āhōm character, and the copying and translation of the Āhōm historical *puthis*.

The knowledge of the Āhōm language is disappearing very rapidly, and the number of *deodhais*, who still preserve a respectable knowledge of their ancestral language, is extremely small, certainly less than a dozen all told. Even these say that it is so long since they made any study of the subject that they are forgetting what they were taught in their younger days, and the rising generation decline to concern themselves with a language which can yield them no practical advantages. They prefer instead to learn to read and write Assamese, and thereby to qualify themselves for mandalships and other similar appointments.

Consequently, it is even now difficult to obtain a correct reading of the coins in the Āhōm character, and to secure a satisfactory translation of the more difficult passages in the *puthis*. It seems to me, therefore, that an intelligent person should be entertained at once to learn the Āhōm language and character, and to supervise the reading of coins and the copying and translation of the Āhōm historical *puthis*. If he worked hard, three or four months should suffice to enable him to learn enough of the language to see that the *puthis* are correctly copied, and that the translations given are fairly reasonable.

If, however, this proposal is approved of, it seems to me that it would be in every way desirable to take the opportunity to obtain copies and translations of all the more important *puthis*, and not merely of those which are exclusively historical in their purport.

18. I recently made some enquiries at Sibsāgar regarding Āhōm *puthis*, and annex a list of twenty-eight, which have been catalogued by Babu Phanidhar Chaliha, Sub-Deputy Col-

Other Inquiries.

lector. The list is admittedly incomplete, even for the extant records of the *deodhais* of Sibsāgar sadr, and there must be many more *puthis* in existence not only there, but also in Jorhāt. The people are afraid that Government has some ulterior object in trying to find out about these books, and more than one man who is known to possess old *puthis* has denied being the owner of any. Then, again, the Bailongs also possess *puthis*, but these, I take it, deal chiefly with divination and kindred subjects.

Turning to the *puthis* already registered by Babu Phanidhar Chaliha, it will be seen that the list includes only three *buranjis*, viz.,—

(1) From Khunlung and Khunlai to Kamalēçvar, *i.e.*, from 568—1795 A.D.

(2) Chukapha, *i.e.*, invasion of Assam.

(3) From Gadādhār to Gaurīnāth, *i.e.*, 1681 to 1780 A.D.

I feel sure, however that more will be discovered after further

search, and in any case, those three would in themselves furnish a sufficient reason for employing some one to learn the language and furnish us with an account of what they contain.

Next to the historical *buranjis*, the *puthis* of which it would, in my opinion, be most desirable to obtain translations are those of a religious nature, as from these we should, for the first time, be able to gather some idea of the form of Hinduism which was carried from India to the Shān states before the rise of Buddhism, or, at any rate, of the extent to which the earlier Hinduism entered into the religion previously professed by the Shāns. Out of the 28 *puthis* in Babu Phanidhar's list, I think that at least 14 should be translated. The copying of a small *puthi* is estimated to take 14 days, and that of a large one 28 days. On an average, it may be assumed that 20 days would be required for copying each *puthi*. This would be done by the *deodhais* themselves, and the remuneration they would require would be about Rs. 10 per mensem. Consequently, it would cost us about Rs. 100 to obtain copies of 14 *puthis*. Assuming that it took the person appointed to supervise the work four months to learn the Āhōm language, we should have to pay his teacher Rs. $4 \times 10 =$ Rs 40. Having learnt the language, he would have to go through each of the *puthis* with the *deodhai* who copied it, and having got its meaning, he would have to translate it. Assuming that this took about the same time as the copying, the translator would be engaged on the work for 280 days, and he would have *deodhais* working with him for the same length of time. Consequently, the total expenditure on the remuneration of the *deodhais* would be Rs. 240, and to this would have to be added the pay of the translator for 120 days while learning the language and 280 days while translating, or about 14 months in all. I can obtain the services for this purpose of an intelligent young Assamese, who has passed the F. A. Examination, for Rs. 30 per mensem, or Rs. 420 for the whole period of 14 months. He would also have to be given a small contingent grant for paper, &c. If more *buranjis* come to light, or if it is decided to deal with all known Āhōm *puthis*, he would be required for a longer period; in the above calculation, I am only estimating for the cost of copying and translating the more important *puthis* in Babu Phanidhar's list. For this purpose, I think that a grant of Rs. 400 this year and Rs. 500 next year would suffice to cover all the charges which are likely to be incurred.

19. If the above proposals are sanctioned, it may perhaps be thought impracticable to sanction a separate establishment for searching for manuscripts until the translation of Āhōm *puthis* has been brought to a conclusion, but even if no special staff is employed, I think we might

be doing something. District officers and others can search for manuscripts and copper plates, and the more important of the former which are known might be copied.* If a small

* I have just heard of some manuscripts in Sibsāgar which will probably prove very interesting.

grant of Rs. 500 a year could be allotted for two or three years, it would, I think, suffice to enable us to get photographs, and rubbings of the inscriptions referred to in paragraph 16 (8), and to obtain copies and translations of such historical and *quasi*-historical writings as are already known to exist, excluding those in Manipur, for the copying and translating of which the State might fairly be called upon to provide the necessary funds. It would also leave a margin for the purchase of the coins referred to in paragraph 16 (1) (3) and (4) whenever any new ones are brought to light, and if any money should still remain available, it might profitably be spent in the gradual exploitation of the old ruins of palaces, forts, and temples which are scattered all over the province. In the meantime, enquiries could be carried on by the district staff and other persons interested into the different sources of information indicated in this Note, and we should thus be able to know, by the time the copying and translating of *Ahóm puthis* has come to an end, in what directions it would be best to continue our operations with a view to rescuing from oblivion the past history of the province.

E. A. GAIT.

SHILLONG,

The 6th September, 1894.

The following papers were read :—

1. *Note on the Oriental Species of the rhopalocerous genus EURYTELA, Boisduval.*—By LIONEL DE NICEVILLE, ESQ., F. E. S., C. M. Z. S., &c.

In 1869, Dr. A. R. Wallace in his "Notes on Eastern Butterflies"* enumerated two species of the genus *Eurytela*, Boisduval, as occurring in the East, *E. castelnaui*, Felder, from the Malay Peninsula (Singapore), and Borneo, and *E. horsfieldii*, Boisduval, from Java. No new oriental species have since been described, but the known habitat of these two species has been greatly extended since then. I find on a close examination of my large series of specimens of the genus, that they can be split up considerably into distinct species; these I briefly characterise below. I have not thought it necessary to figure the new species from India, as Mr. F. Moore will shortly deal with them in his "Lepidoptera Indica," vol. ii. *E. fruhstorferii*, however, from Java, will be more fully described and figured elsewhere hereafter.

* Trans. Ent. Soc. Lond., 1869, p. 331.

Eurytelas appear to be always rare, never occurring in large numbers anywhere. Captain E. Y. Watson has noted that their flight is like that of *Neptis*, as they fly with wings extended flat, parallel with the ground; they settle on the tips of leaves with open wings, and then raise their wings slowly over their backs. This note I can confirm, having seen *E. horsfieldii* alive in the forests at Selesseh in North-Eastern Sumatra. The females of all the oriental species of *Eurytela* on the wing remind one at once of tawny *Neptes*, or more closely of species of *Ergolis*, which is, I believe, a protected genus, and of which the very differently-coloured females of *Eurytela* are probably mimics.

1. EURYTELA CASTELNAUI, Felder.

E. castelnaui, Felder, Wien. Ent. Monatsch., vol. iv, p. 401, n. 26 (1860); idem, id., Reise Novara, Lep., vol. iii, p. 450, n. 739, pl. lxi, figs. 5, 6, *male* (1866); id., Wallace, Trans. Ent. Soc. Lond., 1869, p. 331, n. 1; id., Distant, Rhop. Malay., p. 136, n. i, pl. xv, fig. 10, *male* (1883); p. 441, pl. xliii, fig. 10, *female* (1886); id., de Nicéville, Butt. of Ind., vol. ii, p. 13 (1886); id., Staudinger, Ex. Schmett., p. 105, pl. xxxix, *male* (1885).

HABITAT: Malay Peninsula (*Felder*); Singapore; Borneo (*Wallace*); Perak, Malay Peninsula (*Distant*); Sumatra (*Snellen*); Nias Island (*Kheil*); Palawan, Philippine Isles (*Staudinger*); Daunat Range, Tenasserim, Burma; Taiping and Perak, Malay Peninsula; N.-E. Sumatra; Nias Island (*coll. de Nicéville*).

Male specimens taken in December on the Daunat Range, Tenasserim, have on the upperside of the hindwing a prominent discal black line extending from the costa to the abdominal margin. This black line is also present in one specimen from Sumatra in my collection.

2. EURYTELA FRUHSTORFERII, n. sp.

HABITAT: Central Java, 1500 feet.

The male of this species may be known from the same sex of *E. castelnaui*, Felder, on the upperside of both wings in the blue coloration being of a different shade, distinctly lighter, with a strong gloss, which in some lights causes the surface to present a distinctly glossy green appearance. In figuring *E. castelnaui*, Felder quite correctly portrays the upperside "without gloss," and Dr. A. R. Wallace notes the same thing. The only difference in markings noticeable is on the upperside of the hindwing, *E. castelnaui* having the submarginal black line very narrow and clearly defined, *E. fruhstorferii* having it many times broader, and the edges somewhat diffused.

3. EURYTELA HORSFIELDII, Boisduval.

E. horsfieldii, Boisduval, Faun. Ent. Madagasc., p. 54, n. 1, *male* (1833); id., de Nicéville (*part*), Butt. of Ind., vol. ii, p. 12, n. 302 (1886); *E. horsfieldi*, Wallace,

Trans. Ent. Soc. Lond., 1869, p. 331, n. 2; *E. stephensii*, Boisduval, Faun. Ent. Madagasc., p. 55, n. 2, *female* (1833).

HABITAT:———(*Boisduval*); Java (*Wallace*); ? Fort Stedman. Shan States (*Manders*); ? Karen Hills; ? Singmo, Shan States (*Elwes*); Katha, Meplé (April), Burma; N.-E. Sumatra; Preanger, Java (*colls. de Nicéville and Watson*).

The male of this species is characterised on the upperside of both wings by its rich dark blue coloration, with a very broad submarginal black band to the hindwing. The female, of which I possess a single example only from Sumatra, has the paler markings of the upperside of a somewhat dark shade of ochreous. I have not access to the original description of this species, so cannot say if Dr. Boisduval characterised it from Javan specimens or not; I presume so, however, as Dr. Wallace gives Java as the sole habitat of the species, and its name would indicate that it is a Javan species, as Dr. Thomas Horsfield's researches in the fauna of that island have a world-wide reputation.

4. EURYTELA GLAUDESCENS, n. sp.

E. horsfieldii, de Nicéville (*part, nec Boisduval*), Butt. of India, vol. ii, p. 12, n. 302 (1886).

HABITAT: Papun (November and December), Methalauk near Papun (November), Karen Hills, 500-1500 ft. (December), Toungu (December), Meplé (October and December), all in Burma; Central Java, 1,500 feet (*colls. de Nicéville and Watson*).

The male of this species may be known from the same sex of *E. horsfieldii*, Boisduval, by its very much duller coloration on the upper-side, being of an almost plumbeous or glaucous tint instead of a rich indigo-blue; and it does not possess a broad submarginal black band to the hindwing, and the submarginal black line on the forewing also is obsolete. The female (of which I have access to three specimens) is in two examples from Papun of a more luteous shade on the upper-side than in my single Sumatran example of *E. horsfieldii*, in another Papun example the shade of colour of the upperside is very dark and might be described as dull ferruginous, with the apical portion alone of the broad discal band common to both wings luteous on the forewing.

5. EURYTELA ANDAMANENSIS, n. sp.

Eurytela horsfieldi, Moore (*nec Boisduval*), Proc. Zool. Soc. Lond., 1877, p. 585; *E. horsfieldii*, Wood-Mason and de Nicéville (*nec Boisduval*), Journ. A. S. B., vol. xlix, pt. 2, p. 228, n. 21 (1880); idem, id., l.c., vol. l, pt. 2, p. 245, n. 28 (1881); id., (*part*), de Nicéville, Butt. of Ind., vol. ii, p. 12, n. 302, pl. xviii, fig. 69, *male* (1886).

HABITAT: South Andaman Isles.

The male of this species agrees with the form which I have con-

sidered to be typical *E. horsfieldii*, Boisduval, i.e., it is rich dark blue on the upperside of both wings, with a very broad submarginal black band to the hindwing. The female differs from the same sex of *E. horsfieldii* on the upperside of both wings in having the broad discal band very pale luteous; as compared with the band in *E. horsfieldii* it may be said to be almost white so much paler is it; and on the hindwing it is continued almost to the base of the wing.

2. *A Kashmīrī War Medal*.—By C. J. RODGERS, ESQ., *Honorary Numismatist to the Government of India*.

Some time ago I came across the medal of which the accompanying is a drawing. It has on the obverse the picture of a mountain fort on which is a flag flying. To the left of the fort is the legend—

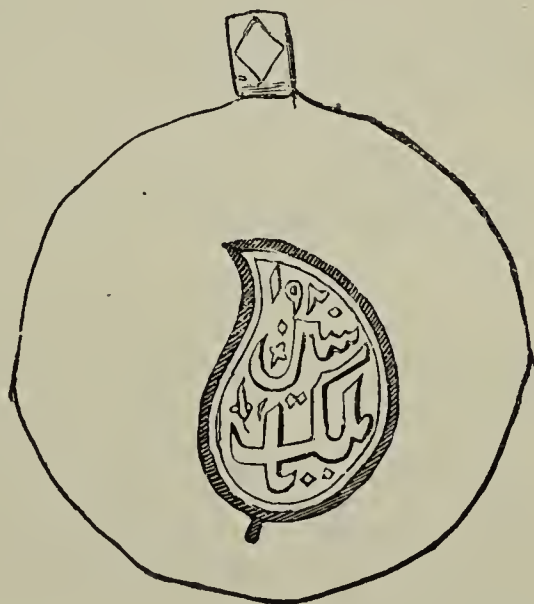
تغمة “ Medal

جوانمردی for bravery

فتح قلعة at the taking of the Fort]

مندوری of Mandaūrī.”

On the other side in a leaf pattern area:— ملک یاسین ۱۹۲۰ — “The country of Yāsīn, 1920 Samvat=1863 A.D.



In Amritsar I could get no information about the Fort of Mandaūrī. I therefore applied to Kashmīr through the Resident. I was informed that a medal had been struck and that no further information was available. So I wrote to Captain Trevor of the XVth Sikhs and asked him to make enquiries. He did so, and his correspondent General Panjāb Singh wrote him and said that the Fort of Mandaūrī, which is the name of the fort at Yāsīn, was taken by General Hoshyārjī according to orders received from His Highness the late Maharaja of

Kashmīr, and that after its conquest medals were struck for both officers and men. The drawing is of the medal for the men.

The medal from which I made this drawing is now in the Indian Museum, Calcutta. It is interesting at the present time when Yāsīn, which is beyond Gilgit, is mixed up with our border affairs.

The medal is interesting as being one of the few, known to us, issued by a Native State, as a memento of services in the field.

We ought to have all the medals of all our wars in India, in the Indian Museum and have them edited with notes on the wars for which they were given.

3. *Ancient Buddhist Statuettes and a Chandēllā copper-plate from the Bāndā District.*—By V. A. SMITH, ESQ., I. C. S., and W. HOEY, ESQ., D. LITT., I. C. S.

The paper will be published in the *Journal*, Part I.

LIBRARY.

The following additions have been made to the Library since the Meeting held in May last.

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ERRATUM.

In *Proceedings, A. S. B.*, for May 1895, page 85, last line :

For Western *read* Eastern.

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR JULY, 1895.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday, the 3rd July, 1895, at 9-15 P. M.

DR. G. A. GRIERSON, C. I. E., in the chair.

The following members were present :—

F. Finn, Esq., The Rev. H. B. Hyde, J. Mann, Esq., Dr. D. M. Moir, R. D. Oldham, Esq., C. R. Wilson, Esq.

The minutes of the last meeting were read and confirmed.

One hundred and twenty-three presentations were announced, details of which are given in the Library List appended.

The following gentlemen duly proposed and seconded at the last meeting of the Society were ballotted for and elected Ordinary Members :—

N. D. Beatson-Bell, Esq., I. C. S.
N. Bonham-Carter, Esq., I. C. S.
H. D. Carey, Esq., I. C. S.
R. W. Carlyle, Esq., I. C. S.
J. G. Cumming, Esq., I. C. S.
J. G. Monohan, Esq., I. C. S.
C. E. A. W. Oldham, Esq., I. C. S.
A. F. Steinberg, Esq., I. C. S.
P. J. Melitus, Esq., I. C. S.
Surgeon-Major L. A. Waddell (re-elected).

The following gentleman is a candidate for election at the next meeting :—

Babu Mahendra Nāth Ray, Howrah, proposed by Dr. G. A. Grierson, seconded by C. R. Wilson, Esq.

The following gentlemen have expressed a wish to withdraw from the Society :—

Dr. G. M. Giles.

Babu Ganeça Chandra Chandra.

The SECRETARY reported the death of the following members :—

A. M. Nash, Esq. (Ordinary Member).

Professor T. H. Huxley (Honorary Member).

The CHAIRMAN reported that Mr. C. R. Wilson had returned to India and had taken charge of the General Secretaryship from Surgeon-Lieut.-Col. G. Ranking.

The PHILOLOGICAL SECRETARY read a report of the Committee of the 10th International Congress of Orientalists held at Geneva, on Transliteration.

10TH INTERNATIONAL CONGRESS OF ORIENTALISTS,
HELD AT GENEVA.

TRANSLATION

OF THE REPORT OF THE COMMITTEE ON TRANSLITERATION.

The Commission appointed by the Congress to adopt a system of transcription of the Sanskrit and Arabic Alphabets has held several sessions.

After having examined and discussed the systems in use up to the present time, and having considered the different improvements which have been proposed to the Commission by its Members and other savants, the Commission submits for the approval of the Congress for uniform adoption by Orientalists the systems put forward in the two tables annexed to the present report.

The Commission has taken as a basis for its work the Report drawn up by a special Committee nominated by the Royal Asiatic Society of London, as well as the methods of transcription generally employed in France, in Germany, and by the Bengal Asiatic Society. The Commission does not claim to have arrived at a perfectly scientific system: it has been necessary to have regard to established customs and also to take into consideration the differences of pronunciation

which the letters of the Arabic Alphabet have received in the various Musulman countries.

This is one of the reasons for the two methods of transcription which the Commission has proposed as alternatives for certain letters.

The number of letters whose transcription is a matter of option has been brought to the very lowest possible number consistent with necessity, and we may fairly hope that Orientalists of all countries will take pains to render this number still smaller, by keeping as closely as possible to the method of transcription to which the Commission has deemed it a duty to give the preference.

With regard to the transcription of Sanskrit there has been far less diversity of opinion, and difficulty has only been experienced in the transcription of a very small number of letters.

In such cases, the Commission, in weighing the various equivalents proposed, has chosen those which on the whole appear to be the most practical. To arrive at uniformity, each country and each Society ought to make certain concessions, and the Commission hopes that the systems now put forward by it will be unanimously accepted and put in practice forthwith.

BARBIER DE MEYNARD.

G. BÜHLER.

J. BURGESS.

M. J. DE GOEJE.

H. THOMSON LYON.

G. T. PLUNKETT.

EMILE SENART.

SOCIN.

WINDISCH.

Geneva, the 10th September, 1894.

TRANSLITERATION OF THE SANSKRIT AND PALI ALPHABETS.

अ	a	कृ	ṛ
आ	ā	लृ	ḷ
इ	i	लृ	ḷ
ई	ī	ए	e
उ	u	ऐ	ai
ऊ	ū	ओ	o
ऋ	r	औ	au

क	. . . . . k	ब	. . . . . b
ख	. . . . . kh	भ	. . . . . bh
ग	. . . . . g	म	. . . . . m
घ	. . . . . gh	य	. . . . . y
ङ	. . . . . ṅ	र	. . . . . r
च	. . . . . c	ल	. . . . . l
छ	. . . . . ch	व	. . . . . v
ज	. . . . . j	श	. . . . . ś
झ	. . . . . jh	ष	. . . . . ṣ
ञ	. . . . . ñ	स	. . . . . s
ट	. . . . . t	ह	. . . . . h
ठ	. . . . . ṭh	ळ	. (in Pali ḷ) ḷ
ड	. . . . . ḍ	◌	(Anusvāra, Niggahīta) ṁ
ढ	. . . . . ḍh	◌	(Anunāsika) ṁ̃
ण	. . . . . ṇ	◌	(Visarga) ḥ
त	. . . . . t	×	(Jihvāmūlīya) ḥ
थ	. . . . . th	×	(Upadhmānīya) ḥ
द	. . . . . d	ऽ	(Avagraha) ˆ
ध	. . . . . dh	Udātta	. . . . . ˆ
न	. . . . . n	Svarita	. . . . . ˆ
प	. . . . . p	Anudātta	. . . . . ˆ
फ	. . . . . ph		

TRANSLITERATION OF ARABIC ALPHABET.

Recommended.		Recommended.	
ا	at beginning of word omit; hamza elsewhere ʾ	غ	<i>g</i> permissible <u><i>gh</i></u>
ب	<i>b</i>	ف	<i>f</i>
ت	<i>t</i>	ق	<i>q</i>
ث	<i>t̤</i> permissible <u><i>th</i></u>	ك	<i>k</i>
ج	<i>j</i> permissible <u><i>dj</i></u>	ل	<i>l</i>
ح	<i>h</i>	م	<i>m</i>
خ	<i>h̤</i> permissible <u><i>kh</i></u>	ن	<i>n</i>
د	<i>d</i>	و	<i>w</i>
ذ	<i>d̤</i> permissible <u><i>dh</i></u>	ه	<i>h</i>
ر	<i>r</i>	ي	<i>y</i>
ز	<i>z</i>	vowels ʾ <i>a</i> , َ <i>i</i> , ُ <i>u</i>	
س	<i>s</i>	lengthened ا' <i>ā</i> , ي' <i>ī</i> , و' <i>ū</i>	
ش	<i>ʃ</i> permissible <u><i>sh</i></u>	diphthongs °ي <i>ay</i> and °و <i>aw</i>	
ص	<i>s̥</i>	e and o may be used in place of <i>ī</i> & <i>ū</i>	
ض	<i>ḍ</i>	also <i>ē</i> & <i>ō</i> in Indian dialects, <i>ü</i> & <i>ö</i> in Turkish. — ل of	
ط	<i>t̤</i> or <i>t̤</i>	article ل to be always <i>l</i> .	
ظ	<i>ẓ</i> or <i>ẓ</i>		
ع	ʿ		

ADDITIONAL IN PERSIAN, HINDI
AND PAKSHTŪ.

پ	<i>p</i>
چ	<i>c̤</i> permissible <u><i>ch</i></u>
ژ	<i>ʒ̤</i> permissible <u><i>zh</i></u>
گ	<i>g</i>

TURKISH LETTERS.

(Omitted.)

HINDI AND PAKSHTŪ.

ث	or	ٲ	<i>t̤</i>
ٲ	or	ٲ	<i>d̤</i>
ر	or	ر	<i>r̤</i>

PAKSHTŪ LETTERS.

خ	<i>ts̤</i>
ځ	<i>g̤</i>
ښ	<i>n̤</i>
ښ	<i>ksh̤</i>

Also in India will be recognized ʃ for ث, ʒ̤ for د, and ʒ̤ for ض.

REPORT OF THE SUB-COMMISSION FOR THE TRANSCRIPTION OF THE
SANSKRIT AND PRAKRIT ALPHABETS.

The Sub-Commission appointed to consider the transcription in Roman characters of Sanskrit and Prakrit has done me the honour of entrusting me with the duty of communicating to you its views.

My first duty is to recall to you the terms in which the question was placed before the Commission—who were not asked to elaborate an Alphabet of a theoretical nature capable of completely satisfying all linguistic demands. That would have been an arduous, and to tell the truth, an impossible task, inasmuch as, to be really definite, the proposals would have had to take into account not only scientific results already achieved or supposed to be achieved, but those also which without doubt, are held in reserve for the future. Its mission was a more modest one. In presence of the systems of transcription already adopted, if I may so say in the rough—on one hand by the Royal Asiatic Society and on the other by the *Deutsche morgenländische Gesellschaft*—but open to modifications of detail, the Commission was called upon to express its opinion, and to attempt above all to arrive, by certain eclectic corrections, at the unification of the two series. We have neither the right nor the power to establish a universal uniformity, which would be the real desideratum.

For instance, I myself did not put forward any French proposition.

The transcriptions in customary use in the various countries have nevertheless, in a general way, shewn such an evident tendency to approach one another that it hardly seems presumptuous in these days, to predict a unanimous accord in the not distant future. It was then desirable to decide those propositions which appeared, from their very simplicity, to be of a nature to form by degrees, a rallying point for all.

We were not able to lose sight of the essentially practical nature of the task assigned to us: we were above all bound to pay special attention to the presumed feeling of India, where the adoption of an uniform transcription in proper names and for daily use is so urgently necessary.

Under these circumstances, the Commission could not fail to incline towards pure and simple acquiescence in the propositions which had been submitted to their consideration, in so far as these propositions were concordant: and this principle met with the unanimous approval of the Commission, except in one point.

The two proposals agree in transcribing the *r* and *l* vowels by *ṛ* and *ḷ* (dotted).

Monsieur de Saussure, who is a high authority on these matters,

thinks that he cannot accept this notation, and he has been kind enough to reduce his reservations to writing in the following terms:—

“It is desirable, in the interests of Indo-European linguistic science, and quite apart from all personal conceptions of the question, that the notation r , l should be preferred to the notation r l for this reason, that in the analysis of every Indo-European language Sanskrit not excepted, the vowels m n hold a position in all respects equivalent to that of the vowels r l ; consequently, if we adopt r l , we compel linguists to write m n , and as a further consequence there arises a confusion between m and certain notations of anusvara—and between n and the cerebral consonant n .”

The Sub-Commission is compelled to recognize the force of this argument which is, moreover, all the stronger from the fact that MM. Bühler and Windisch bear testimony that the German Oriental Society had originally of its own accord inserted in its programme the transcription r and l , with a circle. If in spite of this, the Sub-Commission has not thought fit to propose the adoption of this amendment, its action is due to considerations of a purely practical nature. The German Committee only decided upon the transcription r and l (with a dot) after due discussion, and a special vote.

Would it then be wise to reopen the debate upon a question of detail upon which the German Committee finally accepted without previous agreement, the English proposals? Would not this be to endanger at the very outset, an undertaking the success of which is so eagerly desired? On the other hand, it seems essential to the really wide and general spread of the system, that it should as far as possible, offer to the eyes even of the uninitiated, only such symbols as will neither grate against their sensibilities nor startle them—signs with which they are sufficiently familiar from their habitual use in other directions in the current alphabet.

It is moreover only too evident that the transcription in which we attempt to come to an understanding, would not satisfy the demands of linguistic science, in themselves perfectly legitimate at least without many other retouchings which must, however, be given up since the only excuse for introducing them would condemn the attempt beforehand to an annoying barrenness of results. I pass on to the points very few in number, in which we have been obliged to exercise a choice, owing to the two systems not agreeing. No sign for the long l vowels has been fixed upon by the German Oriental Society. The notation proposed by the London Society, by means of l with two dots underneath it, appears to recommend itself. Typographic exigencies do not permit of the letter l being surmounted by the sign of the long accent. This lack

of symmetry ; side by side with r and \bar{r} , has so much the less importance because the l as a long vowel is more rarely used.

For the e and the o in Sanskrit it seems of no advantage to place the sign of the long accent above the letter ; no confusion is possible : and it appears preferable to keep the use of diacritical signs for exceptional cases where, whether in Sanskrit or in Prakrit, one has to denote the short e or the short o , \check{e} , \check{o} .

For the guttural n , we propose to adopt \dot{n} with a dot above it. It does not seem that there is any ground for introducing as the London table proposes, a particular sign specially invented to meet this unique case. The notation \dot{n} is widely used among Indianists of all countries, and as for the objection which the London Society advances against the addition of a diacritical sign over a consonant, this has all the less weight with us in that every one agrees in accepting the form \tilde{n} to represent the palatal \tilde{n} . The notation \dot{n} is based on the analogy of other nasals and need give rise to no surprise.

By a very curious change of positions it is the English who propose ζ for the palatal sibilant and the Germans who propose the notation \acute{s} , whereas \acute{s} was originally very generally employed in the English transcriptions and ζ in those of the continent. This is perhaps, for the very reason of the wide diffusion of this sign ζ , the most delicate point upon which you have to decide.

Your Sub-Committee did not underrate the difficulties which exist in modifying old customs, and the danger there is of more serious error between three different s forms. If however, they finally decide in favour of the transcription \acute{s} , this decision is not due to any excessive desire for symmetry between the sibilants, but is for three reasons which it will suffice to rapidly indicate.

The first is happily expressed by the report of the London Society. It rightly recommends preference being given to transcriptions of such a kind that in cases where the diacritical signs are compulsorily or accidentally omitted, the pronunciation will not be too far disfigured for European ears. Although this principle is not capable of invariable application it is good to keep to it as far as possible.

On the other hand, great stress has been laid upon the disfavour with which the notation ζ is sure to be regarded in India : the French practice having only familiarised very few people with this letter. This would come as a surprise to the great majority of those interested. Dr. Bühler considers that if we attempted to bring over to it, for example the *Indian Antiquary*, we should encounter an invincible opposition. This is a consideration whose gravity it is impossible to ignore. The superiority of \acute{s} for clearness and convenience of indexing has no less impressed the Commission.

The table of the German Oriental Society transcribes the cerebral *l* by *ḷ* with a point subscript. There is not it is true any serious risk of confusion in practice between the vowel and the cerebral *l*. It is however preferable to establish a difference between the writing of the two letters, so that each separate symbol of the Devanāgarī alphabet may possess its appropriate equivalent in the alphabet of transcription. The *ḷ* with a line subscript answers perfectly, as the London Society proposes, for the notation of the cerebral *l*.

Against this the transcription of Anunāsikā by *ṁ* in place of the simple sign *—* placed above the vowel recommends itself at once by its symmetry with the notation *ṁ* of the anuswāra and by the advantage which it possesses of reflecting, by an alphabetic character the phonetic value of which it is the exponent equally with all the other signs. Upon these bases, the alphabet of transcription would be thus constituted.

a ā i ī u ū ṛ ṝ ḷ ḷ̣ e ai o au
k kh g gh ṇ
c ch j jh ñ
ṭ ṭh ḍ ḍh ṇ
t th d dh n
p ph b bh m
y r l v ś ṣ s h ḷ ṁ ṃ̇
 visarga *ḥ*
 jīhvāmūliya *ḥ*
 upadhmānīya *ḥ*

As to the accents, the udātta would be represented by the acute accent ' ; the svarita by the circumflex ^ ; and the anudātta by the grave accent `.

Such, gentlemen, are the modest conclusions without pretensions to being systematic, which your Sub-Committee has the honour to submit to you.

Your Sub-Committee is of opinion that it is only by very carefully adjusted reforms that it will be possible to make any decisive progress in the unification of rival systems.

The coöperation of two powerful Societies such as the German Oriental Society and the Royal Asiatic Society of London whose agreement under these conditions would appear to be assured, cannot fail to be a very powerful lever.

There is moreover every ground for hope that propositions so eclectic and so little ambitious will command even other and valuable adherents.

EMILE SENART.

PROPOSALS

OF THE

SUB-COMMITTEE FOR THE TRANSLITERATION OF THE
ARABIC ALPHABET.

1. The Committee agree upon the following :

ب *b* — ت *t* — ح *h* — د *d* — ر *r* — ز *z* — س *s* —
ص *s* — ف *f* — ق *q* — ك *k* — ل *l* — م *m* — ن *n* —
ه *h* — پ *p*

2. For ج they recommend *j* but will allow *dj* to be used as a substitute.3. For ض *ḍ* but allow *z* in India.4. For ط *ṭ* and for ظ *ẓ*. This is to avoid upsetting the Indian accepted system — elsewhere *t* and *z* will suffice.5. For ي *y* whenever ي is a consonant. Whilst fully appreciating the reasons why German Orientalists have preferred *j*, the Committee feel obliged to adopt the character used throughout India and by English, French and many other writers and scholars.6. ʾ at the commencement of a word need not be transliterated, *Hamzah* in the middle or at the end of a word to be represented by ' above the line.

7. For ع ' above the line (a comma reversed).

8. For

ث خ ذ ش غ ژ چ
ṭ ḥ ḍ ṣ g z ʿ

but agree that *th kh dh sh gh zh ch* may be used as substitutes for the above.They consider that *ṭ, ḥ* etc., are better than *ṭ̇, ḥ̇, ṭ̇, ḥ̇* etc., or any others in which the mark is placed above the consonant, as in this position the mark may be taken for the accent of a vowel, the cross of a *t*, etc., etc.They will allow in India as substitutes for the above ث *ṣ* and ذ *ẓ*.9. For و as a consonant *w*.10. For گ in Persian, Hindustani & Turkish *g*.

11. (Omitted.)

12. That the Hindi and Pakshtū characters be represented thus

ط or ٲ t — ٲ or ٲ d — ٲ or ٲ r
 ٲ ts — ٲ g — ٲ n — ٲ ksh

13. The J of the article J always to be transliterated l .

14. That the vowel-points be a , i , u .

The lengthened vowels ā , ī , ū . That e and o may be used in place of ī and ū in these languages in which it may be necessary. That ü and ö may be also used in Turkish and ē and ō in Indian dialects.

That the so called diphthongs ay and aw .

G. T. PLUNKETT.

THE HONORARY PHILOLOGICAL SECRETARY laid on the table two communications received from Maulvī Abdul Walī of Sailkapa, Jessore, regarding Mr. W. Irvine's article on *Guru Gōbind Singh and Banda*,¹ and the correspondence between that gentleman and Mr. C. J. Rodgers on the same subject.² Maulvī Abdul Walī states that the name of the author of the *Farrukh Shāh Nāmāh*³ was Mīr Muḥammad Aḥsan, and not Iḥsan. The book is wrongly called *Farrukhshiyar nāmāh*. During the reign of Shāh 'Ālam, Mīr Muḥammad Aḥsan Ījād was appointed Vakīl to the sarkār of Prince 'Azīmu-sh-shān, son of Shāh 'Ālam, by Āṣaf Jāh (*Nizāmu-l-mulk*), and was given by that Prince a command of three thousand troop. In Farrukhshiyar's reign he received the title of *Mā'nīyāb Khān* and was employed by him to write the *Shāh Nāmāh*, which he used to show once a week to the Emperor, receiving on each occasion a reward of Rs. 1,000, and a *Khil'at*. Having completed his History to the end of Farrukhshiyar's reign, Muḥammad Aḥsan died in 1133 H.

The above facts are extracted from Mīr Ghulām 'Alī Āzād's Biographical work, the *Khazāna-i-Amīrah*.⁴

The Maulvī also suggests that the correct spelling of Lohgarh and *sacā pādshāh* on p. 134 of the *Journal*, Vol. LXIII, Pt. I, should be Lōhāgarh and *saccā pādshāh* respectively. He translates the inscription on p. 135 as follows: 'Guru Gōbind Singh *inherited from* (not *found in*) Nānak, sword, pot, and conquest, help without hindrance.' As regards *Sadhaura* or *Sādhaurā*, he points out that Mīr Ghulām 'Alī Āzād in

¹ See *Journal*, Vol. LXIII, Pt. I, pp. 112 and following.

² See *Proceedings* for 1895, pp. 35 and ff.

³ *Proceedings*, 1895, p. 37

⁴ Incorrectly called the *Khīrānah-i 'Amīrah* of Ghulām 'Alī Arad, on p. 38 of the *Proceedings* for 1895.

the *Khazāna-i-Amirah* (Lith. Ed. p. 425) says that Ananda-ram, *Mukhlis* the poet and *raīs*, was an inhabitant of سودهرا *Sūdahrah* or *Sūduhrah* within the jurisdiction of Lāhōr. He suggests that this may possibly be the same place as Sādhaurā.

The HONORARY PHILOLOGICAL SECRETARY exhibited a remarkable carved conch shell, forwarded by Mr. Gait, and read the following letter from that gentleman which accompanied it. The Inscription reads
१५९२ सकत अग्रन मासत श्री-श्री-युत वीर-दर्प-नारायण कालत इ सङ्ग काटि ।

DEAR SIR,

I am sending for exhibition a shell with the ten *avatārs* carved on it, which has been found in the possession of a native of the Cachar District, and forwarded to me for inspection by Babu Krishna Kumar De, Assistant Settlement Officer. The shell is interesting on account of the inscription, which is to the effect that it was carved in the reign of Vīra-darpa-nārāyaṇa, in the month of Agrahāyaṇa, 1593 Çaka (1671 A.D.)* No written records of the Kachārī rāj have hitherto come to light, and the traditions of the people give little more than a long list of kings. Any items of definite information such as that contained in this inscription, are, therefore, most useful.

The same King is referred to in an Āhōm burañji, which was translated into Assamese and published in the Arunōdai of 1851 A.D., in which it is stated that in 1567 Çaka (1645 A.D.), he sent messengers to the Āhōm King, Nariā rājā, asking for his daughter in marriage. In this burañji he is called also Hiḍimbēçvara and Vīra-bhadra.

The same burañji speaks of a Kāchārī invasion in 1410 Çaka (1488 A.D.), in the course of which the Āhōms were defeated on the bank of the Dikbu river. Thirty-seven years afterwards an Āhōm force ascended the Dhansiri river to attack the Kāchārīs, and a few years later, in another war, the Kachārī King, Khunkhara, was killed, and one Neochung was set up in his place. In 1457 Çaka (1535 A.D.), Neochung was in his turn attacked, and his brick city at Duimapur was sacked; Neochung himself escaped at the time, but was subsequently captured and beheaded. About 1525 Çaka (1603 A.D.) there were hostilities between the Kāchārīs and the Jaintia rājā, in which the latter managed to embroil the Āhōm King, by offering him his daughter in marriage on condition that he should fetch her by a route which lay through the Kāchārī country.

* The peculiar symbol used to represent the figure 5 which occurs on coins of the Āhōm, Koch, Tippera, and Jaintiā Kings, is found again in this inscription.

An inscription on a ruined temple at Maibong runs—

Çaka 1643 (1721 A.D.), Çr Hariçcandra Bhūpati.

There is a Sanad in existence bearing the name of Kīrti-candra-nārāyaṇa, in which certain arrangements are made for the Government of the plains portion of Cachar, which is interesting as showing that the final retreat of the ruling family from Maibong in the North Cachar Hills to Khāspur in the plains of Cachar, had taken place before that date. This movement is said to have been due to oppression by the Jaintiās, just as the exodus from Duimapur to Maibong is ascribed to the continued attacks of the Āhōms. The latter movement probably took place after the sacking of the city in 1457 Çaka (1535 A.D.)

Yours truly,

E. A. GAIT.

The following papers were read :—

1. *On Mogul Copper Coins.*—By C. J. RODGERS, ESQ., Honorary Numismatist to the Government of India.

The paper will be published in the *Journal*, Part I.

2. *Description of a new species of Oxyrhynch Crab of the Genus Parthenope.*—By SURGEON-CAPTAIN A. ALCOCK, M.B., C.M.Z.S., Superintendent of the Indian Museum.

The paper will be published in the *Journal*, Part II.

3. *Note on some Coins of Koch Kings.*—By E. A. GAIT, ESQ., I. C. S.

4. *Some Notes on Jaintiā History.*—By E. A. GAIT, ESQ., I. C. S.

5. *Note on some Āhōm Coins.*—By E. A. GAIT, ESQ., I. C. S.

The papers will be published in the *Journal*, Part I.



LIBRARY.

The following additions have been made to the Library since the Meeting held in June last.

TRANSACTIONS, PROCEEDINGS AND JOURNALS,

presented by the respective Societies and Editors.

Berlin. Der K Akademie der Wissenschaften zu Berlin,—Abhandlungen, 1893.

———. ———. Sitzungsberichte, Nrn. 24–38, 1894; 1–25, 1895.

Calcutta. Indian Engineering,—Vol. XVII, Nos. 23–26.

———. Maha-bodhi Society,—Journal, Vol. IV, No. 2.

———. The Medical Reporter,—Vols. V, Nos. 10; VI, 1.

———. Photographic Society of India,—Journal, Vol. VIII, No. 6.

Dublin. Royal Irish Academy,—Cunningham Memoirs, No. 10.

Frankfurt a. M. Der Senckenbergischen Naturforschenden Gesellschaft,—Abhandlungen, Band XVIII, Heft 3.

Havre. Société de Géographie Commerciale du Havre,—Bulletin, Mars-Avril, 1895.

Leipzig. Der Königl Sächsischen Gesellschaft der Wissenschaften zu Leipzig,—Abhandlungen, Band XXI, Nrn. 6; XXII, 1–2.

———. ———. Berichte über die Verhandlungen, Nrn. 1–2, 1895.

Liege. Société Géologique de Belgique,—Annales, Tome XX, Nos. 3; XXI, 3; XXII, 1.

London. The Academy,—Nos. 1203–6.

———. Anthropological Society of Great Britain and Ireland,—Journal, Vol. XXIV, No. 4.

———. The Athenaeum,—Nos. 3526–29.

———. Institution of Electrical Engineers,—Journal, Vol. XXIV, Nos. 115 and 117.

———. Nature,—Vol. LII, Nos. 1334–37.

———. Royal Geographical Society,—Geographical Journal, Vol. V, No. 6.

———. Royal Microscopical Society,—Journal, Part I, 1895.

———. Royal Society,—Proceedings, Vol. LVII, Nos. 340–41 and 343.

———. Zoological Society of London,—Proceedings, Part I, 1895.

Munich. Der K. B. Akademie der Wissenschaften zu München,—Sitzungsberichte, Math-phys. Cl., Heft I, 1895.

———. ———. ———. Phil. u. hist., Cl. Heft I, 1895.

Mussoorie. The Indian Forester,—Vol. XX, No. 4.

Paris. Société de Géographie,—Comptus Rendus des Séances, Nos. 7-10, 1895.

———. Société Philomathique de Paris,—Compte Rendu Sommaire de Séance, No. 14, 1895.

———. Société Zoologique de France,—Bulletin, Tome XIX, Nos. 1-9.

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Nr. 4, 1894.

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PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR AUGUST, 1895.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday, the 7th August, 1895, at 9-15 P.M.

SURGEON-LIEUTENANT-COLONEL GEORGE RANKING, M.D., in the chair.

The following members were present :—

Maulvī Abdus Salam, Dr. A. R. S. Anderson, F. Finn, Esq., Dr. G. A. Grierson, Bābu Pañcānana Mukerjee, L. de Nicéville, Esq., R. D. Oldham, Esq., Paṇḍit Haraprasād Čāstri, C. R. Wilson, Esq.

The minutes of the last meeting were read and confirmed.

Forty-four presentations were announced, details of which are given in the Library List appended.

The following gentleman duly proposed and seconded at the last meeting of the Society was ballotted for and elected an Ordinary Member :—

Bābu Mahendranāth Rāy.

The following gentlemen are candidates for election at the next meeting :—

T. W. Richardson, Esq., I.C.S., proposed by Dr. G. A. Grierson, seconded by Surgeon-Lieut.-Col. G. Ranking.

Bābu Rām Dīn Singh, Bankipur, proposed by Dr. G. A. Grierson, seconded by C. R. Wilson, Esq.

Bābu Lachmi Nārāyan Sing, M.A., B.L., Vakeel, High Court, proposed by Dr. G. A. Grierson, seconded by Paṇḍit Haraprasād Čāstri.

Henry DeCourcy Agnew, Esq., proposed by J. Mann, Esq., seconded by C. R. Wilson, Esq.

Rai Yatīndranāth Rāy, M.A., B.L., Zeminder of Taki, proposed by Mahāmahopādhyāya Maheç Candra Nyāyaratna, seconded by Bābu Pratāpa Candra Ghoṣa.

Shams-ul-Ulama Shaikh Mahomed Gilani, Persian Instructor to Government, proposed by Surgeon-Lieut.-Col. G. Ranking, seconded by Dr. G. A. Grierson.

The following gentleman has expressed a wish to withdraw from the Society :—

Bābu Hem Candra Gosvāmī.

The SECRETARY reported the death of the following members :—

Dr. V. Ball (non-Subscribing Member).

Dr. R. Gösche, (Associate Member).

Professor Rudolf von Roth (Honorary Member).

THE HONORARY PHILOLOGICAL SECRETARY read the following announcement of the death of Professor Rudolf von Roth, an Honorary Member of the Society.

The Council regret that it has fallen to their duty to report the death, in the seventy-fifth year of his age, of Professor Rudolf von Roth, Doctor of Philosophy, Theology and Laws, Ordinary Professor of Oriental Languages and Chief Librarian of the University of Tübingen, Member of the Academies of Berlin, Munich, Göttingen, Vienna, St. Petersburg and Paris, and an Honorary Member of the Asiatic Society of Bengal, which took place on the 23rd June, 1895.

Rudolf Roth was born at Stuttgart on April 3rd, 1821. After taking his degree at Tübingen, he went to Paris, where, together with Max Müller, he studied Oriental Literature under Burnouf. He then proceeded to England, where he applied himself to the Vedic MSS. of the East India House and the Bodleian, and returned to Tübingen in 1845. Shortly afterwards he published his first work on the Literature and History of the Véda, which was received with great favour. In 1848 he was appointed Extraordinary, and, in 1856, Ordinary Professor of Oriental Languages at Tübingen; since which time he published numerous essays and treatises of minor importance; but the work with which his name is imperishably connected is the great St. Petersburg Sanskrit Lexicon, the first volume of which appeared in 1855, while the last was completed in 1875, twenty-five years after the book was first undertaken. In this he was associated with Dr. Böhtlingk, who took charge of the department of Classical Sanskrit, while Roth principally devoted himself to Vedic, and to Medical Literature. Roth's contribution to this monumental work has ever since remained the founda-

tion of all Vedic research ; this is the greater testimony to his learning and accuracy, when we remember that at the time when he wrote, there were few printed texts available, and nearly all his information had to be collected from manuscript materials.

Oriental scholars feel that in losing Rudolf von Roth, the “ old man eloquent ” of Sanskrit learning, they have lost not only a great teacher but a close friend. His hospitable house on the vine-clad banks of the Neckar was ever open to the travelling student, where the boundless stores of his learning were ungrudgingly placed at the disposal of the inquirer. He had many distinguished pupils, of whom, perhaps, the late Professor Whitney is the best known, and when the Philological Secretary was in Tübingen some ten years ago, he found there, studying under him, pupils of men who had been Whitney’s pupils, all of whom had sat in turn at the feet of the eminent Professor.

Dr. von Roth was elected an Honorary Member of this Society in 1881. He was ennobled by the late king of Württemberg in recognition of his great services to oriental scholarship. The University of Edinburgh gave him the degree of LL.D., *honoris causa*, and he was honoured in various ways by many Continental Academies and Societies, but the greatest testimony to his learning, is the monument, *ære perennius*, which he has left in the pages of the St. Petersburg *Wörterbuch*.

The SECRETARY reported that Mr. N. D. Beatson-Bell had compounded for his subscription as non-resident member by the payment in a single sum of Rs. 300.

The HONORARY PHILOLOGICAL SECRETARY exhibited a copper-plate grant, by which king **Çiva Simha** of Mithilā gave the village of Bisapī to the famous poet **Vidyāpati Thakkura**, and made the following remarks :—

This grant was translated by me in the *Indian Antiquary*, Vol. XIV (1885), p. 190, in an article entitled ‘ Vidyāpati and his contemporaries.’ I had then to depend on a copy procured through the agency of a Paṇḍit. The Grant is dated in the era of Lakṣmaṇa-Sēna, 292, equivalent to A.D. 1400. The corresponding Vikrama-sambat, Çak, and (apparently) Hijra dates are also given. For reasons which it is unnecessary to state, I was unable then to get hold of the original plate. My attention has been again drawn to the matter by an article of Dr. Eggeling, No. 2864 of Part IV of the Catalogue of the Sanskrit MSS. in the Library of the India Office. In describing a MS. of the *Durgā-bhakti-tarangiṇī*, he discusses the whole question of Vidyāpati’s life and times. There is no doubt that the date of this grant gives

rise to serious difficulties in regard to the chronology of Vidyāpati's life, and it is, as Dr. Eggeling says, desirable that the grant itself should be carefully examined. Through the kind offices of Mr. Tute, the Collector of Darbhanga, I have at length been able to obtain possession of the plate for a limited period. It has been photo-zincographed, and a reduced facsimile is published in the *Proceedings* of the Society (Plate III), so as to allow of its leisurely examination by experts in epigraphy.

The following papers were read :—

1. *Ancient Cēdi, Matsya and Karūṣa*.—By F. E. PARGITER, ESQ., I.C.S.

2. *Description of Lhāsa Cathedral, translated from the Tibetan*.—By SURGEON-MAJOR L. A. WADDELL, LL. D.

3. *Note on Viṣṇupur Circular Cards*.—By PAṆḌIT HARAPRASĀD ĆASTRI, M.A.

The papers will be published in the *Journal*, Part I.

4. *A contribution to the History of Artificial Immunity*.—By SURGEON LIEUT.-COL. GEORGE RANKING, M.D.

5. *On some new Orchids from Sikkim*.—By DR. G. KING and R. PANTLING, ESQ.

6. *Noviciae Indicae, IX. Some additional papaveraceae*.—By DR. D. PRAIN.

7. *A list of the Butterflies of Sumatra with special reference to the species occurring in the North-East of the Island*.—By LIONEL DE NICEVILLE, ESQ., F.E.S.

The papers will be published in the *Journal*, Part II.

LIBRARY.

The following additions have been made to the Library since the Meeting held in July last :—

TRANSACTIONS, PROCEEDINGS AND JOURNALS, *presented by the respective Societies and Editors.*

Baltimore. Johns Hopkins University,—Circulars, Vol. XIV, Nos. 119–20.

Batavia. Bataviaasch Genootschap van Kunsten en Wetenschappen,—Notulen, Deel XXXIII, Aflevering 1.

Berlin. K. P. Akademie der Wissenschaften zu Berlin,—Sitzungsberichte, 1–23, 1894.

- Bombay. Bombay Natural History Society,—Journal, Vol. IX. No. 4.
 ———. The Indian Antiquary,—Vol. XXIV, Part 301.
- Boston. American Philological Association,—Transactions, Vol. XXV.
 ———. Boston Society of Natural History,—Memoirs, Vol. III, No. 14.
 ———. ———. Occasional Papers, No. 4.
 ———. ———. Proceedings, Vol. XXVI, Parts 2-3.
- Brisbane. Royal Society of Queensland,—Proceedings, Vol. XI, Part 1.
- Budapest. Société Hongroise de Géographie,—Bulletin, Tome XXII, Nos. 6-10.
- Calcutta. Indian Engineering,—Vol. XVIII, Nos. 1-5.
 ———. Maha-bodhi Society,—Journal, Vol. IV, Nos. 3-4.
 ———. The Medical Reporter,—Vol. VI, Nos. 2-3.
 ———. Photographic Society of India,—Journal, Vol. VIII, Nos. 7-8.
- Chicago. The American Antiquarian and Oriental Journal,—Vol. XVII, No. 3.
 ———. The Open Court,—Vol. IX, No. 12.
- Danzig. Der Naturforschenden Gesellschaft in Danzig,—Schriften, Band VIII, Heft 3-4.
- Dorpat. Naturforscher-Gesellschaft,—Archiv für die Naturkunde Liv-Ehst-und Kurlands, Band X, Lieferung 3-4.
 ———. ———. Sitzungsberichte,—Band X, Heft 2.
- Florence. Società Italiana di Antropologia, Etnologia e Psicologia comparata,—Archivio per L' Antropologia e la Etnologia, Tome XXIV, No. 3.
- Frankfurt a. M. Der Senckenbergischen Naturforschenden Gesellschaft,—Abhandlungen, Band XVIII, Heft 4.
- The Hague. Koninklijk Instituut voor de Taal,-Land-en Volkenkunde van Nederlandsch-Indië,—Bijdragen tot de Taal,-Land-en Volkenkunde van Nederlandsch-Indië, 6^e Volgr, Deel I, Aflevering 1.
- Iasi. Organul Societatii Stiintifice si Literare din Iasi,—Arhiva, Anul VI, Nos. 5-6.
- Königsberg. Der Physikalisch-Ökonomischen Gesellschaft zu Königsberg in Pr.,—Schriften, Band XXXV.
- London. The Academy,—Nos. 1207-11.
 ———. The Athenæum,—Nos. 3530-34.
 ———. Institution of Mechanical Engineers,—Proceedings, No. 4, 1894.
 ———. Nature,—Vol. LIJ, Nos. 1338-42.
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PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR NOVEMBER, 1895.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday, the 6th November, 1895, at 9 P.M.

SURGEON-LIEUTENANT-COLONEL G. RANKING, M.D., in the chair.

The following members were present:—

H. K. W. Arnold, Esq., Bābu Nagendarnātha Basu, His Grace Archbishop Dr. P. Goethals, Dr. G. A. Grierson, C. Little, Esq., Bābu Pañcānana Mukerjee, L. de Nicéville, Esq., Dr. D. Prain, Bābu Mahedranātha Roy, Rai Jatindranātha Roy, Paudit Haraprasād Çāstri, C. R. Wilson, Esq.

Visitor:—Bābu Tarapada Chatterjee.

The minutes of the last meeting were read and confirmed.

Ninety-five presentations were announced, details of which are given in the Library list appended.

The SECRETARY reported that the following gentlemen had been elected Ordinary Members of the Society during the recess in accordance with rule 7:—

T. W. Richardson, Esq.
Bābu Rām Dīn Singh.
Bābu Lachminārāyan Singh.
Henry DeCourcy Agnew, Esq.
Rai Yatindranath Rāy.
Shams-ul-Ulama Shaikh Mahomed Gilani.
Kiran Chandra De, Esq.
Moulvie Mahomed Abdul Kadar, Khan Bahadur

The following gentlemen are candidates for election at the next meeting.

J. Kennedy, Esq., I.C.S., Magistrate and Collector of Murshidabad, proposed by Dr. G. A. Grierson, seconded by C. R. Wilson, Esq.

Charles Swift Delmerick, Esq., Sub-Deputy Opium Agent, Budaon, proposed by V. A. Smith, Esq., seconded by Dr. G. A. Grierson.

Pandit Harimohan Vidyabhushan, proposed by Dr. G. A. Grierson, seconded by C. R. Wilson, Esq.

The following gentleman has expressed a wish to withdraw from the Society :—

F. B. Shawe, Esq.

The SECRETARY reported the death of the following members :—

M. Louis Pasteur, Paris (Honorary Member).

H. H. The Maharaja of Jahore (Ordinary Member).

The CHAIRMAN announced that in accordance with Rule 38 of the Society's Bye-laws, the names of the following gentlemen had been posted up as defaulting members since the last Monthly General Meeting, and would now be removed from the Members' list, and that the fact would be published in the Proceedings.

J. B. Lee, Esq.

H. N. Thompson, Esq.

Jwalaprasad, Esq.

Pandit Brij Bhukan Lal.

N. F. F. Smith, Esq.

Dr. G. M. Giles.

Carr Stephen, Esq.

Bābu Kally Prasanno Sen Gupta.

Dr. J. R. Adie.

G. Hughes, Esq.

A. Constable, Esq.

The PHILOLOGICAL SECRETARY laid on the table letter No. 3325, dated 21st September, 1895, from the Under-Secretary to the Government of Bengal, General Department, covering copy of a communication addressed to the Government of India in the Revenue and Agricultural Department, with enclosures, reporting on the measures taken by the Lieutenant-Governor to procure for the Indian Museum facsimile reproductions of the Asoka Inscriptions in India.

The following is Mr. Caddy's general report:—

Dated Calcutta, the 22nd August 1895.

From—ALEXANDER E. CADDY, ESQ., on Special Duty,

To—The Secretary to the Government of Bengal, Revenue Department.

I have the honour to submit a general report of the tour I have just completed and of the operations connected therewith.

2. His Honour was pleased to depute me to visit the several sites of the Asoka inscriptions in Bengal enumerated below, and to bring away plaster casts of each inscription. I was also required to photograph the *locale* of these inscriptions and other objects of allied interest:—

I & II.—The two *Champaran* columns, north and south of Bettiah.

III.—The *Sasaram* rock edict, in Shahabad.

IV.—The dedicatory tablets of the *Barabar* and *Nagarjuni* caves—seven in number—in the district of Gaya.

V.—The inscribed rock at *Jaugado* in Ganjam, in the Madras Presidency.

VI.—The inscribed rock at *Dhauli*, about 25 miles due south of Cuttack.

VII.—The inscription of *Aira Raja* in the cave at *Udaigiri*, about 6 miles north of *Dhauli*.

VIII.—The dedicatory and descriptive tablets in the *Udaigiri* caves—nine in number.

3. At a committee held in your rooms previous to this appointment, at which Sir Alfred Croft and Mr. Jobbins were present, it was determined that the casts should be in plaster of Paris, and that the moulds should be brought to Calcutta and worked out.

My deputation commenced on the 15th October, and I was provided with a staff of two modellers, a plaster man, and *khalasi*.

Messrs. Mackintosh, Burn, and Company were to supply me all with the gypsum I wanted, as my plaster had to be prepared on the spot.

4. My first care had been to study the properties of gypsum and the several processes of converting it into plaster. Mr. Brühl, of the Civil Engineering College at Sibpur, helped me in this considerably, and we determined that the Madras method, as described by Dr. Hunter in one of the 1851 numbers of an Art journal published in Madras, was the best.

5. I had seen my modellers at work, but not with satisfaction as to their method: it took too much time; and I consequently devised means whereby a quantity of plaster may be dealt with at once and efficiently.

6. Taking the mail train at Howrah on the night of the 15th, I reached Mokameh Ghat the next morning. The railway ferry took us on to the Bengal and North-Western Railway line at Semaria Ghat, and a day's run brought us into Bettiah.

7. In Champaran there are two pillars bearing identical edicts with those on the Allahabad and Delhi columns, one 20 miles north, and the other 21 miles south of Bettiah. The villages in which they stand are both called *Lauriya*, and a second local name is necessary to distinguish them. Near the northern pillar there is the old ruin of the fort of *Navandgarh*; near the southern column are the large market village and the Mahadeo temple of *Araraj*. The two Lauriyas are distinguished by these names respectively.

The simple term *Lauriya* would imply the *Navandgarh Lauriya* by reason of its being a larger village, its having a post-office and a police outpost, and of the main road to Nepal passing through it. The *Araraj Lauriya* stood first in the order in which I should take the inscriptions, and there I first went.

The two *Lauriyas* are reached from Bettiah. I rode to *Barharwa* on an elephant; hence to the column at *Lauriya Araraj* in a bullock coach.

8. The Sub-Deputy Opium Agent, Mr. Bean, asked me down to *Barharwa*, a village four miles west of *Araraj* and the head-quarters of his agency. I found every convenience for my work of preparation here, and I have reason to thank Mr. Bean for the facilities he afforded me.

The rains and floods had just before breaking made traffic difficulties at Mokameh Ghat somewhat serious. My gypsum had not reached Bettiah, nor my tents. The latter I had determined to leave at Bettiah till I went north, as tent equipage was already at my disposal.

The work of grinding and sifting gypsum got on apace. An oven had been built in deference to the wishes of my modellers, who were not acquainted with the boiling method (as the Madras process is termed), and which was finally adopted.

A few canisters of plaster being ready, and the weather permitting, we went into camp at *Lauriya Araraj*.

9. The *Araraj* column stands just by the threshing-floor of the village. It is a sandstone monolith $36\frac{1}{2}$ feet high and 120 inches in girth at the inscription. The southern side still retains its beautifully polished surface; on the other side a lichen has slightly abraded it. The inscription is intact.

The work before us was much heavier than we had imagined, and it took proportionately longer doing.

On the 21st November I had the satisfaction of seeing the inscribed

portion of the column in a plaster jacket, and of stripping it the same evening.

10. As they now lie in the Museum, these mould plaques are curved slabs of plaster of Paris measuring, most of them, $23'' \times 15''$, and a little over an inch in depth, enclosing a piece of wire netting bound in an iron frame. Each has been barked from the column after being blocked on to it by pouring the liquid plaster into a cell, the inner side being the inscribed stone surface; the outer a stout sheet of tin, the net being suspended in the hollow. A rubber tube led the plaster quietly to the bottom of the well, thus saving much laborious manipulation. These I brought into Bettiah and left there till my return from the northern *Lauriya*.

Among other objects of interest shown me by Mr. Gibbon at Bettiah were a few stones from the coping of a well near *Tribeni*, which bore the honeysuckle ornament of the Erectheum, common to several Asoka columns, and of which he permitted me to take casts, which I have with me now at the Museum. He also arranged for my *dák* to *Lauriya Navandgarh*.

11. At *Lauriya Navandgarh* the work was soon in train. *Araraj* experiences had taught us some lessons, and we saw the plaster gradually covering the inscribed portion of the column in regular slabs.

This pillar is somewhat smaller than that at *Araraj*; the latter is massive, and its capital, if it had any, was long since lost. This is the more graceful of the two, and is surmounted by a lion capital. The shaft and inscription are in the same condition as that at *Araraj*, and in the same material. The couchant lion faces the rising sun. He sits on a circular abacus, the rim of which is girdled by a string of *hans* (the sacred geese of the Buddhists). This rests on a cable string-course which crowns a Persepolitan lotus-capital or terminal, whose gracefully drooping petals end just outside an egg and dart ovolo, the entablature finishing below in a second cable string-course. The design and workmanship disclose both knowledge and power. The jaw of the lion has been destroyed.

12. I had a *rajmistri* go up to the entablature and mould off a portion of the goose frieze and of the terminal, so that when the column is set up in the Museum it will not end quite abruptly.

13. At the *Navandgarh Lauriya*, while examining one of the ancient barrows which characterise this village, I found two belts of iron in the same prependicular axis, from which I surmised they must have bound the earth end of some tall pole. It is probable the report noted by General Cunningham regarding an iron coffin may have had its origin in some such find. From here I returned to Bettiah by elephant, and

stayed at the dāk bungalow till my cases were despatched to Calcutta. There were 86 moulding pieces in 12 cases.

14. My next journey was to *Sasaram*. Travelling back by rail to Mokameh, I joined the East Indian Railway regular line at Bankipore, whence 32 miles to Arrah.

At Arrah the Sone Canal has a terminal lock. It is the headquarters station of Shahabad. A contract steamer plies the canal to Dehri, in which I travelled the 51 miles from Arrah. The remaining eighteen miles I had to drive to *Sasaram*. I arrived there on the 31st December, and on New Year's Day I had the mould of the rock inscription completed.

Where the Kaimur range of hills ends in the sandstone cliffs near *Sasaram*,—on the crest of its last peak, some 400 feet above the surrounding country, may be seen the *chirāg* of a Muhammadan fakir of a dark night. In the day the white tomb of a Muhammadan saint gleams above it. The *chirāgdān* (or candle-stick) stands in a small recess on the broken side of the cliff towards *Sasaram*. A wall is built on either side of it not quite five feet high. Two ledged rocks make an angle pointing inward, where the *chirāgdān* on a third rock stands at the apex. The ledge on the left hand bears an inscription 42 inches long and about a foot deep. It is an extra edict of Asoka, and is important for the figured date it bears, 256 years of the Nirvana.

From below, the entrance to the cave may be observed as a small square hole in the hillside near the top. The inscription itself is scarcely known, even in *Sasaram*.

15. So soon as my *Sasaram* case was despatched, we returned to Bankipore to take the Gaya railway, which has its junction here with the East Indian Railway.

Gaya is 57 miles—a three hours' run from Bankipore. I made it my base and sent out my camp to the Barabar hills, 15 miles north. The little station of *Bela* is 12 miles up the line from Gaya—45 miles from Bankipore; it stands abreast of a group of hills. The nearer one, *Kauwā Dhōl*, with its grand *tor* surmounting it, makes a very picturesque mass. A road takes one east from Bela, past this hill and the hill next it, where it norths and skirts it at its eastern extremity; then turning east again, passes the *Barabar* hill-path and the very holy *Patal-ganga* well, which receives the perennial waters from a *Barabar* spring. Again it recurves northward, crosses a field and reaches the *Nagarjuni*, and ends at the stair leading to the milkmaid's cave. Round the *Nagarjuni* hill, either way, paths will lead one to the two caves behind, among detached boulders.

16. The locality about the *Barabar* hills is one of the Holy Places of the Buddhists.

Here, over the dome-like tops of an outcrop of granite, has been cut a stepped-path which leads to the caves which were at one time an important centre of Buddhist devotion. Long granite rocks with domed roofs run north-east and south-west. In one of them three chambers of some size have been excavated, each with its own door, which is recessed considerably into the rock, to allow the perpendicular walls of the cave to be a safe distance from the outer contour of the mass. I had to bring away moulds of the dedicatory tablets to each of these caves, and to make photographs of them. This was soon done. Of the caves, the one with the most imposing exterior is least finished inside. The work here seems to have been abandoned on the workmen coming on a fissure of more than usual dimensions, but the other two caves and the entrance to the third, and a good part of the *Lomas Rishi* cave, too, have their walls and roofs highly polished. The glass-like polish given to these surfaces has been the admiration and wonder of ages.

17. The doorway of the *Lomas Rishi* cave represents the entrance to a handsome hut-chapel, the arch being enriched by a frieze of elephants, the space surrounding it being filled with an elaborate wainscotting. The door has sloping jambs, Egyptian-like. The rock is a quartzose gneiss, and where the elephants are carved, a whiter stone makes the ornament very effective.

18. The *Sudama* cave, called also *Nyagrodha** or Banian tree, has a perfect chamber terminating in a *Chaitya* chapel, the whole circular dome being carefully made and highly polished.

19. The third cave in this rock is on its other face. The *Karnachopar* is a single chamber. It bears a very much worn tablet outside, on which I was able to trace the representation of a fish which does not seem to have been observed before. In the doorway, too, there is some fine lettering (comparatively modern), and a word or two in the still undeciphered shell character. Another cave in this range of hills lies east of this group and opens southward. A small vestibule of polished gneiss or granite (as it is commonly called) leads to an unfinished inner *Chaitya*—a very small one. The inscription, being in the polished recess, is in excellent preservation except where viciously chiselled out.

20. On either side of this rocky ridge there is a plain which would hold a large assembly. To the north-east there is a shallow tank beyond which is an extensive field from which the hills rise up a few hundred feet, and which is crowned with a Hindu temple of the *Siddheswara linga* referred to in a later inscription in the *Vapiya* cave.

* "*Nigoha Khubha*"—Banian tree cave, according to General Cunningham. It seems that caves were often named after some tree growing near by *e. g.* *Nyagrodha*, the Banian tree; *Pippali*, the Pipal tree; *Saptaparna*, a septafid tree.

21. Not far from here, about a mile or more by road, is another group of hills of the same material. Here there are three more caves which form the *Nagarjuni* group. The *Gopi* cave is very picturesquely situated some seventy feet above the plain. It is a large vaulted chamber, nearly fifty feet long. Both ends are circular. It is approached by a flight of stone stairs, but a small crenelated brick wall completely hides the door. Masses of granite boulders are fantastically piled up over the cave roof. I am sorry to say I did not obtain a photograph of this very picturesque spot owing to the failure of my apparatus—it had been too much in the hands of coolies of late.

22. The following list particularises the seven Magadha caves:—

The Barabar caves. 1, 2 and 3 dedicated by Raja Piyadasi—

1. *Sudama* cave. [The *Nyagrodha* or Banian tree] 33 feet \times 19; vaulted, $12\frac{1}{2}$ feet high. Inner domed chapel: 18 feet in diameter: two lines of inscription record its gift to mendicants. 251 B. C.
2. *Viswa-Jhopri*. Vestibule $14 \times 8\frac{1}{3} \times 6\frac{1}{2}$ high. Inner circular chapel, irregular, 11 feet diameter at its widest. 251 B.C.
3. *Karna-chopar* (on the north side of the rock), $33\frac{1}{2}$ feet \times 14; vaulted, $10\frac{3}{4}$ feet high. Single room. 244 B.C.
4. *Lomas Rishi* cave, The same dimension as the *Sudama* cave; unfinished ceiling and floor, domed chapel unfinished. No Asoka inscription.

The Nagarjuni caves. Dedicated by Raja Dasaratha, a grandson of Asoka, in the year 218 B.C.—

5. *Gopika* (or milkmaid's cave). Single chamber 46 feet 5 inches \times 19 feet 2 inches. Vaulted, 10 feet 6 inches high with circular ends.
6. *Vapiya* cave. Vestibule 6 feet \times 3 feet \times $5\frac{1}{2}$ high, room $16\frac{3}{4}$ feet \times $11\frac{1}{4}$ and $10\frac{1}{2}$ feet high, vaulted. So named from a well near by.
7. *Vadhathika khubba*. Is in a cleft of the *Vapiya* rock, west of the cave. It is a small chamber with a narrow entrance. Inside, a small brick partition has been built with a very narrow entrance.

23. Completing the work at my *Barabar* camp, I return to Gaya, and an opportunity presenting, I took what spare plaster there was to *Bodh Gaya*, and took moulds of some objects of allied interest—an inscription on the altar, its honeysuckle and goose ornament, a quadrant of the *Vajrāsan*, or adamant throne, and of a quadriga chariot of the sun on one of the pillars now in the Mahanth's house.

24. I was also able to secure a photograph of the temple with a

characteristic group of the Mahanth and his college of *chelas* in the foreground.

Preparations for my return to Calcutta complete, I was just leaving Gaya, when a packet was placed in my hands requiring me to go into the *Rajgir* valley to bring away casts of the long, rambling inscription in the rocky roadway, in what Prinsep has called the "shell" character. I had a reserve cask of gypsum in Bankipore, which I sent on to Bihar. I stayed a day here to consult Mr. O'Donnell, the Magistrate and Collector of Patna, as to the space the inscription occupied, that I might not run short of material eventually. No one, however, seemed to have any idea of the extent of surface covered by the inscription by actual measurement.

25. From Bankipur I traversed the ground between there and Patna. Dr. Waddell identifies this space with the ancient Pataliputra specifically, and I followed the sites consecutively as he details them. Some objects of note and interest lay on the way in modelling and sculpture. In clay there was an unique model of a hill. When Mahendra, the son of Asoka, was converted to Buddhism, during the intense reaction which took place about this period in the religious expression of the people, he sought the valley of *Rajagriha* for refuge, and the cave of Buddha on *Gridhrakūta* for meditation. To wean him back to Pataliputra, an artificial hill was built on this spot, and its ruin still retains the name of *Bhiknapahāri* (the mendicant's hill), the *mohulla* being called *Mahendra*. On *Bhiknapahāri* stood this clay model not so very long ago. Its purpose was evidently to supply the workmen with an idea of the hill as it should be made, and I determined while in the *Rajgir* valley to discover any resemblance which might exist between model and prototype. It has been an object of worship from time immemorial, and owes its preservation to perennial renewals.

There was some sculpture, too, a caryatid figure of Maha Maya with alto-relievo figures on either side, and a sculptured coping which I saw, belonging to the period of Asoka, and this is absolutely all that is left above ground of the stone-built palace of Asoka, or the court of Chandragupta (Sandracottos).

26. A traveller has to take *Rajgir* from Bakhtiarpur, 28 miles nearer Calcutta than Bankipore. A mail coach here takes one 19 miles due south to Bihar, where there is an isolated hill of quartzite, once occupied by Buddhists. From here the Subdivisional Officer, Mr. Gupta, drove me down to *Rajgir*. The road strikes south-west. We left Bargaon at the 7th mile-stone, and turning due south rode through the large village of Silāo (renowned for its sweet pastry); and the lesser one of Panditpur. Here the bar of hills enclosing the *Rajgir* valley, becomes

more distinct. Another mile (the fifteenth) and we were in the modern *Rajgir*. This too we pass, and through the ruined fort of old *Rajgir*, the capital of Magadha before Asoka's time. The walls and ramparts are still from 20 to 50 feet high. Here we halted at the inspection bungalow. Mounds of ruins lie between us and the valley, while right and left are level fields.

As we look southward into the valley, from either side of the emerging stream rise two hills. To the east is *Vipula*, to the west *Baibhār*, while inside is the long valley of 42 miles which reaches from Giryak (14 miles due south from Bihar) to Gaya. The pass through this valley is the only traversed spot in its whole length.

In the *Rajgir* valley I found the inscription to straggle over a space of nearly 200 yards, and to consist of 35 patches, the large deep letters being cut into the floor of a sparry rock, which had been chiselled down to form a roadway 20 feet wide to the *Bawanganga* defile. The road led from the southern gate of old *Rajagriha* and the *Nekpai* embankment to the palace of Jarasandha near where the *Bawanganga* debouches over a rocky defile into the *Panchānan* river.

27. The "shell" character is still a puzzle to philologists. Most likely it is a cypher for the initiated only, which was in vogue among dispersed Buddhists during the 7th and 8th centuries. General Cunningham, speaking of some of these characters found on a pillar at *Rajaona*, says as to their readability, "I have already made some progress towards it." He did not know of the *Rajgir* inscriptions, and does not mention those in the *Son Bhandār* cave in this valley.

28. My workmen were soon on this inscription, and made over eighty moulds without covering the whole inscribed surface. I made tracings of the rest, and having taken bearings and distances, so as to enable me to lay the inscriptions down relatively as they lie on the roadway, I had them packed for Calcutta.

29. During the time I was here, I was able to visit the sites of chief interest in the valley.

The valley of *Rajgir* is all holy ground to the Buddhist.

The sacred feet of Buddha have trod all its paths, his presence has hallowed all its caves, and his touch made holy all its streams. Nor to the Buddhist alone is this holy ground. The Jain is everywhere where the Buddhist has been, and his symbols and *tirthankaras* occupy all the high places of the Buddhist. To the ordinary Hindu, too, a place sacred to one sect is sacred to him also. The Buddhist pillars of Asoka enter into the Pantheon of the Hindus of each locality as their Phallic emblem. Images of Buddha, and Chaityas from his ruined temples, are everywhere to be found enshrined in groves and holy places. Buddha

himself is absolutely unknown, but his image is worshipped variously; indeed, in one locality, the site of the Nalanda monastery, his image is worshipped as *Rukmini*. Elsewhere a traditional worship has come down, and I have seen his statue garlanded and milk poured over its mouth—vermeil and redlead touching up every prominent feature, as it also does with every other object they hold sacred.

30. The objects of interest in the *Rajgir* valley, besides the shell inscriptions, are:—

- 1st.—The hot springs; where Brahmans have prepared bathing places and built small temples, which make a very picturesque group at the entrance of the valley.
- 2nd.—The basement known as *Jarasandha ka baithak*, immediately above these temples.
- 3rd.—The *Pipolo* cave; where Buddha used to sit in deep meditation, after his midday meal. Originally it was a pit from which stone was quarried for the basements.
- 4th.—The Great Northern Caves.
- 5th.—A ruined temple of Mahadeo.
- 6th.—The *Son Bhandār* cave.
- 7th.—The cyclopean walls and platforms and the *Nekpai* embankment.
- 8th.—The causeway to *Sailagiri*, with the two stairs leading one to Ananda's cave and the other to Buddha's.
- 9th.—The eaves in the *Sailagiri* rocky eminence,—called *Gridhrikūta*.

31. Ascending the *Baibhār* hill we pass several basements and the remains of two stupas. Continuing, we pass three Jain temples and come to a fourth. Here, descending a mountain path, a few yards, we come to another basement, and crossing on to a natural platform, just north of this temple, we are immediately in front of the Great Northern Caves. These caverns pierce the hill horizontally for a depth of fifty feet and more, leading into cross-galleries running at right angles to them for thirty or forty feet. Many of the minor recesses near this may be taken as caves. It is a mile from the *Pipolo* cave, in the northern shadow of *Baibhār*; consequently it answers the precise description given of the *Saptaparna* cave by the Chinese traveller Fa Hian, so far as position is concerned. Of the tremendous labour with which it was converted into an assembly hall for the 1st Buddhist synod, where 500 Arhats met to discuss the future of Buddhism, there is no trace. The stairs, if any, have long since disappeared; of embellishment there is none. A small paved space exists at the entrance of the principal cave, but this may have been made at any time.

32. Returning to the temple and descending the hill a few yards on the opposite side, we find the ruins of an old temple of Mahadeo, where two *lingas* have at one time each claimed devotion from the worshippers. A few pillars are still standing, not very perpendicular, but nothing of the original exterior remains.

33. Returning to the foot of the hill, and following its base near the stream which skirts it, a little less than a mile brings us to the *Son Bhandār* cave—the treasury of gold. This is an artificial chamber, 34 feet by 17 nearly, with an arched ceiling of $11\frac{1}{2}$ feet. The polishing of the interior may not compare with that of the Barabar caves, but still it is noteworthy. Outside the cave there is a level space which gradually merges into the plain. At one time the cave was embellished, and stucco still adheres to the ceiling. A window lights up the cave at the end, away from the door. Outside and inside there are and have been inscriptions dating from the remotest antiquity. Some are readable, others barely so. A very interesting Pali inscription is lost from over the door. Three or four letters remain of it. Of the shell character, too, there are two or three examples.

The chief interest attaching to this cave is its supposed identity with the *Saptaparna*. The meaning of this word is seven-leaved. Not very far outside is to be found a septafid tree—the *bombax Malabaricum*—or common *sīmal* tree, whose bloom throws a crimson note into the March landscape everywhere in India. The leaves group in seven from a common centre, and the term would scarcely apply to a row of seven, as has been proposed for what I believe is the great northern cave. The name *Nyagrodha*, too, has been applied to this cave, as it is to one of the Barabar ones which especially was a sanctuary; *Nyagrodha* meaning the banian tree. But the *Son Bhandār* cave has outside, a few feet above the door, a series of mortice holes, which must at one time have supported a roof covering a portion of the space in front of the two caves. There are also stairs cut in the rock leading up to a seat midway between this cave and its companion.*

This cut stair, the several mortice holes, and sundry other chisellings on the rock-face having a constructive purpose; the general embellishment of the cave, and its expensive polishing, could only have been done by royal command. Its correspondence with the Burmese account of the *locale* of the synod, as translated by Bishop Bigandet, throw much evidence into its favour as the *Saptaparna*.

34. Another cave, too, claims this distinction—the *Pipolo* cave at

* Originally there were two caves of almost similar dimensions; the one to the right has been blasted down by treasure-seekers, the name of the cave being taken too literally.

the foot of the *Baibhār* hill. It is near the *Asura's* house (*Jarasandha ka baithak*). Ceylonese authorities claim it as being the cave which corresponds most to the description in the *Mahavanso*.

The authority mostly in favour of the *Son Bhandār* being the *Saptaparna* is General Cunningham, while Mr. Beglar claims this distinction for a cave I have been unable to discover or identify on the north of *Baibhār*, except it be for the series of the great northern caves I have mentioned. Mr. Fergusson has accepted Mr. Beglar's idea, without being certified as to the existence of the cave described by him.

35. Great interest in the ruins of the ancient city of *Rajagriha* attaches itself to the almost cyclopean walls, embankments, and highways which endure to the present. The highway leads over the embankments and city walls to the crest of the hills forming ramparts which an invading army of old would have found a complete obstruction. One wonders who would seek this barren waste, whose stony ground produces nothing but thorn and scrub bamboo, where trees occur at great distances apart and are all stunted. Yet at one time we hear of these embankments, to which a miraculous origin is ascribed, converting the country into a smiling garden and the city into a famine-proof granary.

36. We hear, too, of King Bimbisara and his chariot—how he had a highway built up the side of *Chatagiri* to the rocks of *Sailagiri*, and how he went in state to hear the words that Buddha had to say for the comfort of humanity; for among these rocks which overhang so and threaten the timid, there are crevices and caves which were holiest places to the successive bands of Buddhists who have sought refuge here, where the great teacher lived and taught. From these rocks, right up to the very crest of *Sailagiri*, were built *stupas* and *vihāras* which were made waste and laid low, when a newer religious fervour directed its hate towards Buddhism,—in its turn to be forgotten for many a century past.

37. I traversed this highway several times—noted the stupa built right in the road, which marks where King Bimbisara dismounted from his chariot, and where again, on arriving at the upper flat in front of the caves, another stupa records his sending back of the crowd, if we take Fa Hian's account to guide us. Here, crossing over the boulders lying in the now dry bed of the mountain torrent, I was able to again follow up the old road, which leads to the two principal caves by a *direct stair to each*, and which I was only able to discover after having the jungle cleared for two or three days. Some six or seven caves, none of any size, exist here. The rocks having naturally fallen into their present position, which I should say is barely different from what it was

twenty-five centuries ago, and which have not been touched by the chisel for any purpose whatsoever, in vain I sought some stone-cut record of the past. Statues shattered and mutilated of the Buddha I found here, but nothing more. There were bricks all over the place; a stucco rosette in one of the caves shows that it had been plastered and embellished. Here, too, is the great stone fronting the cave Ananda occupied, whereon the Vulture Mara sat and with outspread wings terrified his soul, and there is the kindly crevice through which the comforting hand of Buddha came and rested on his shoulder, divesting him of fear. The very spot where I placed my not irreverent camera to record the present condition of the cave is where the vulture sat who gave the name *Gridhrakūta* to this group of caves.

38. Here it was that Mahendra, more than two centuries later, sought refuge in Buddha, and the small clay hill I saw at *Mahendra* near Patna, is a model of this hill. The centuries between, and its perennial renewings, have altered its outline in detail only. The slanting highway reaching from the foot of the hill to the cave level opposite has been worn down to almost a level road at its water-course end, where one would naturally imagine the approach to be eminently difficult. The caves, too, are rightly placed behind the wall of rocks, the mud representing which seems here to have been piled higher as the road wore down. So there is an unmistakeable similarity, although the likeness may not be at first sight obvious.

39. I returned to Calcutta in the middle of February, and after seeing all my moulds stored away in the Museum, I took up my southern tour.

40. There remained to do—

1st, the Asoka inscription at *Jaugada* in the Madras Presidency;

2nd, a rescript of the same edicts at *Dhauli*;

3rd, the singular record of self-laudation by the Aira Raja over the cave entrance in *Udaigiri*; and

4thly, a number of small dedicatory tablets from various caves of the *Udaigiri* and *Khandagiri* group.

41. I booked by the *Calna* for Gopalpur, a seacoast town of the Madras Presidency, about 350 miles from Calcutta. It is the port of the Ganjam district; it is also the summer resort. Berhampur is the sadar station. Ganjam is but a small station. I was at Gopalpur in the first week of March, and immediately made for *Jaugada* by way of Berhampur. The nearest post-town to *Jaugada* is Purushottapur, just the other side of the *Rishikulia* river, and the nearest village to the fort is Pandya; the whole journey from Gopalpur being about 41 miles. The assistant tahsildar was of great help to me at *Jaugada*. While the

plaster was preparing, I availed myself of an invitation from Mr. Minchin at *Aska*. (Mr. Minchin, I may note, is the gentleman who has identified himself with the manufacturing industry of the country, to whose enterprise is due the prosperity of the present sugarcane cultivators.) I was in some hope of seeing a photograph of the *Jaugada* inscription when it was intact in 1857. Mr. Minchin took the negatives home with him, and left them at the India Office at the request of the Madras Government. Nothing has since been heard of them. He was, however, instrumental in drawing the attention of Government to its possible defacement from the chipping off of the rock-surface.

I was not, however, to see them, as Mr. Minchin was disappointed to find he had not a copy left.

42. All that remains of the ancient fort of *Jaugada* is an immense enclosure within a moat and a running mound, 15 to 20 feet high, which is entered at several openings where gates have been.

Within this square enclosure two or three piles of granite rocks are most picturesquely grouped, and west of the glen, where the principal structures have been, indications of which still exist, an immense rock rises up with a circular outline, on the perpendicular face of which Asoka's edicts have been engraved. There are two sets of edicts; the left-hand tablet bearing the edicts common to the Girnar, Shahbazgiri, and Khalsi rocks, and the right-hand ones, enclosed within a line border, bearing symbols at the corners—local edicts addressed to the officers governing the state of *Samāpā*—a name unidentified in the ancient geography of India. Most probably *Samāpā* was a city on the banks of the *Rishikulya* close by. Magnificent banian trees have avenued the road along the riverside, a remnant few of which are still to be seen. The inscription was first brought to notice by Sir W. Elliott, when it was more perfect. An attempt to make an impression of it has destroyed the larger part of the inscription since. There used to be a double-storied house close to this rock occupied by a *jogi*, obscuring the view of the edicts, when earlier sets of photographs of the inscription were taken. It has since been demolished.

43. On my completing this work I came through *Rambha*, at the southern extremity of the Chilka lake and 28 miles from *Jaugada*, whence I had the pleasant experience of sailing across the *Chilka* lake in a country-boat with a great mat sail. Old Buddhist traditions cling to the water-borne population here. Boats still carry on their prows Buddhist emblems whose purpose or meaning is absolutely forgotten.

44. Coming into Orissa I proceeded to *Khurda*, where Mr. McPherson very kindly made me his guest, and arranged for my travelling and camp at both *Khandagiri* and *Dhauili*; the whole distance from

Rambha including the boat journey being 83 miles. A considerable time was taken up in the preparing of plaster. This gave me some leisure to examine the caves and to select my sites for photographing them.

45. *Khandagiri* and *Udaigiri* are the two hills formed of the sandstone outcrop in Orissa, some 19 miles south of Cuttack and 14 miles east of Khurda.

46. The perpendicular bluffs have been cut into for all the caves. Natural caverns, where the sandstone forms the arched roof of a cave, are frequent. The *Hathigumpha* is the largest of them. The upper story of the *Rāni Naur* Palace cave is a similar arch, for the support of which the pillars placed there recently are quite unnecessary. The sandstone bluffs are in three distinct levels of elevation.

47. *Lowest level.*—In the lowest level are the caves facing south, and seen *enface* from the bungalow—the *Alakapura-jayavijaya* and *Swargapura* (in the second story). An effaced Pali inscription near the elephant frieze (the largest elephant sculpture in these hills) witnesses to its age, while the huge male elephants approaching the arch on either side (they are four-tusked and are tended by female elephants) show the importance of this cave.

The lower story of the *Rāni Naur* Palace cave is on the west of this bluff, and to the east, a row of small caves with a stair leads up to the second bluff.

Second level.—In this to the west is the upper story of the Queen's palace; on the east there is the *Vaikuntha* group. The roof of this group and of the *Rāni Naur* form the upper terrace of this bluff.

Third level.—North-east of the Queen's palace cave, in the third bluff, we have the *Ganesa* cave, so called from a figure of Ganeśa carved in its inner chamber, near which there is a Sanskrit inscription. The south-west face of the bluff has in its basement the *Hathigumpha*, above which several caves lead up to the platform forming the flat top of Udaigiri hill. The south-east corner of the bluff is broken into a number of detached rocks which are severally excavated into the Snake, the Tiger, and other caves which mendicant Buddhists have occupied.

48. Aira Raja occupied the caves of the *Vaikuntha* group. Inscriptions, fragmentary unfortunately, describe him as a disciple of *Kadipa*, a worshipper of the sun, a mighty Raja (of Kalinga) whose elephant is as a thundercloud. In illustration whereof there is the adoration of the Sun and *Triratna* by a series of academical figures, which may relate to Kadipa's college of disciples,—heavenly musicians fill the air, while a grandly-proportioned elephant closes the procession. This neglected piece of sculpture is very nearly obliterated. The half

on the other side is quite gone; of what remains I have brought a cast to Calcutta.

49. The *Hathigumpha* in all probability was the *Pilkhāna* or elephant-house. But from its prominent character the rounded brow of the cave has been selected for the laudatory inscription, in Asoka characters, which gives it its importance.

50. Considering the nature of the sandstone—gritty, friable stuff that it is—it is fortunate not to have come under the weathering influences which have obliterated larger-featured sculptures.

51. Most of the dedicatory tablets are obscure and of no importance, save for their ancient character. One—that on the Tiger cave—points to a period when there was a change in religious opinion, and some intolerance prevailed. The Tiger cave is labelled as the chamber of a fierce anti-Vedist.

52. Between the two hills a road now runs where jungle filled the glen, and the stair leading to the cave level of *Khandagiri* gives access to caves unknown when Fergusson visited the place. Here, on the level of the highest bluff of *Udaigiri*, is the *Ananta* cave, opening to the north. Of the Asoka inscription which once described it, little is now discernible.

Mr. Fergusson has attached some importance to this cave, for besides the description of it by Dr. Mitter, and the photographs of the sculptures by Mr. Locke, he had the Commissioner of Orissa ask Mr. Phillips to visit the cave before he was satisfied that all particulars had reached him.

At page 72 of his book on the “Rock-cut Temples of India,” under the joint-authorship of Mr. Burgess, he says, referring to the four sculptured tympana inside the arches, two of which are perfect:—“From our knowledge of the sculpture of Barhut, we may safely predicate that in addition to the *Tree* and image of *Sri*, the two remaining tympana were filled, one with a representation of a *wheel*, and the other of a *dagoba*, the last three being practically the three great objects of worship both here and at Sanchi.” What I have written in my fuller report, before I saw Mr. Fergusson’s book, is to this purpose.

53. The *Ananta* cave has been an important place of worship; Within its inner chamber is a sketch-relief of what has been supposed to be a preaching Buddha. This figure has been accepted by Dr. Mitter and others as a Buddha—probably it is a *Tirthankara* made at a later period; above his head are a row of emblems,—the *trisul* flanked by a shield on either side, and these again each by a tree emblem and then the swastika.

This cave, already described by Fergusson, Dr. Mitter and others

had not yet been exhausted of its treasures. The Museum is enriched with casts from two of its four tympana. The worship of the railed *Bodhi tree* and of the auspicious *Sri* account for two. The grime of centuries has concealed the religious significance of the two fractured tympana.

The fourth or left-hand sculpture represents the better half of a composition dealing with the apotheosis of the four-tusked elephant. (It will be remembered that when Buddha was lord of a herd of 1,000 elephants, he carried four tusks, according to a birth story figured in one of the Bharhut sculptures.) The artist here has tried within a limited bas-relief to give every detail of the vast bulk of the lordliest of elephants. The Sun is in attendance, and two female elephants on each side offer their lord a lotus-worship. Much of the right-half with one female elephant is lost.

The tympanum between this and *Sri* shows the quadriga of the Sun *enface*. Aruna is surrounded by the heavenly host. The Moon is there in her first quarter, and *Rahu*, too, is largely present. Female attendants minister to Aruna. The left-half of the sculpture is partly lost.

54. I am glad to say I have secured casts of these two sculptures.

55. On this *Khandagiri* hill are other Buddhist caves, some with ancient Pali inscriptions. But the Jains have mostly made it their resort. In these caves, or the remains of them, their numerous *Tirthankaras* with their *Saktis* look down from the high position which they occupy on the eastern hillside, while the top of the hill is crowned with a double temple, which was restored during the Mahratta irruption into Orissa.

56. While the work at *Khandagiri* was completing, I went on to *Dhauli*.

In the fork where a tributary enters the *Dyah* river lies an ancient tank—the famous *Kosali-ganga*, regarding the excavation of which interesting legends exist. Probably it is one of those enormous tanks Buddhists have dug wherever they have made a home for themselves. Now much of it is filled up and given over to cultivation. To the west of this tank is an obtruded group of granite rocks, forming the isolated *Dhauli* hill. This hill throws out a spur which reaches the tank, and which, with the northern end of the hill, makes a basin-like valley between, with the *Kosali-ganga* in front of it.

Not far from the dry tank a block of granite flanks the spur, and, on entering the valley at this point, an elephant seems to approach one from out of the domed top of the rock, out of whose solid mass it has been excavated. This is the upper half of the *Aswastama* rock; the lower

north face, which has been polished, bears the inscription of Asoka's edicts.

The local edicts here are identical with those at Jaugada, the city named being *Tosali*. This is considered the same as *Dosara*, on the *Dosaron* river.

57. Between *Dhauḷi* and *Khandagiri* I had twice to pass through *Bhuvaneswar*. I could not help noticing the extreme beauty of some of these ancient temples. Artistic surprises met one everywhere. Naturally, one wonders when he meets grouped together in this remote corner of India, objects of artistic or religious significance peculiar to Rome and Greece, Phœnicia and Egypt. Ganeśa has fruit offerings placed before him on a Delphic tripod; long gaunt figures adorn the great temple, which might have been studied on Cleopatra's Needle; children drawn with a grace, and figured with a freedom which Albani might have envied; statuettes and figures, grouped and singly, which disclose a grace one would hardly associate with Indian sculpture—all the work of the past!

58. Besides the great temple I would name as deserving protective care—

the *Mukteśwara* and *Parāsurāmeśwara*,
the *Brahmaneśwara* and *Bhāskareśwara*,
the *Baital Deul* and the *Raj-Rāni* temples.

Each of these has structural and archæological peculiarities of its own. The first three in this list have been the models for the hundreds of temples which have made *Bhuvaneswar* peculiarly the city of temples.

I returned to Calcutta through Cuttack and *viâ* Chandbally, arriving here on the 4th of June.

A cordial vote of thanks was proposed by Dr. G. A. Grierson to the Government of Bengal for the interest taken in the matter of Asoka Inscriptions in India, which was carried by acclamation.

The PHILOLOGICAL SECRETARY circulated the following table of comparison of selected words and numerals in several Assam languages forwarded by Mr. S. E. Peal of Sibsagar.

Comparison of some Words in

“NG” soft, as in “SINGER,”

			I Pronoun.	THOU	BIRD	BLACK
Tibetan, written	...					NAK
Tibetan, spoken	...		NGA {	KHYOD „ ED	} B'YU	NAG
Burmese	...	...	NGA	NENG	GNHET	
Singpho	...	...	NGAI	NANG	WU	CHANG
Kunung	...	...		
Kamti	...	...	KAU	MAU	NOK	NAM
Mishmi	D M	...				
Miri SHAI'YANG	...		NGA °	NA	P'TANG	YAKa
Abor	...	...	NGA °	NA	P'TANG	YAKa
Bhotia LHO	...	...	NGA		CHYA	NAG
Chang lo	...	{	NGA and JANG	} NAN	KHA	CHANG
Kachari Bodo	...	...	ANG	NANG	D'AU	ga SAM {
Garó	...	...	áNGA	NAá	D'AO	pe NEK
Hill Tippera	...	...		
Khasia	...	...	NGA	ME PHA	SIM	i' ONG
Kuki	...	...			WHA	NIK
Kumi	...	...	KAI	NAN {	WA WO	} {
Kyaw	...	...	KIMA	NAMA	WA	
Angami	...	...	A'	NO	P'RA	KATI
Manipuri	...	...	AINA	NANG	UCHEK	AMUBA

the following Languages.

not hard, as in "ANGER."

EAR	EYE	FISH	PIG	ROAD	WATER
	MIK	GNA	PHAK		CHU
			PUAG	LAM	
NA	MYET	NGA	WET {	LAM LAN	} YE
NA	MI	NGA	WA	LAM	N'SIN
a NA	NE or ME	NA chi		PARA	WANG
HU	TA	PA	MU	TANG	NAM
YERUNG {	MIK A MI aa	} e NGA	EYEG {	LAM LAMBE'U	} a CHYE
NArung {	MIK a MI ng	e NGO NGA	} EYEG	LAMBE	a SI
NAmcho	MIG. MIT.	NGA	PHAK	LAM	CHU
NA	MI ng	NGA	PHAK	LAM	RI
MA NA	} MIG. MIK.	NGA	OMA	LAMA	DOI
NA chil	MAK ar	NA tok	WAK.VAK {	LAM RAMA	CHI
ku NJU	MAK	a NGA			
ka SHKOR	ka kh' MAT	DOH KHA	U SNIANG	ka LYN ti	ka UM
NA	MHE. MIT.	NA {	WAI. WET WOK	} LAM	TUI. TI
ku NO ka NA	a MIK a MI	NGO NGAU	} AUK {	LAM LANG	} TUI
NA {	ME et MI	} NGWA {	WET VAUK	} LAMM	TUI
NIE	MHI	KO	VOK	? CHA	DZU
NA kong	MIT	NGA	OK	LAM pi	ISING

Comparison of some Words in

“ NG ” soft, as in “ SINGER,”

		I Pronoun.	THOU	BIRD	BLACK
Lushai— DZO	... ..			
CHIN	... ..			P'AYO	NI
Kacha NOGA	... ..			
Banpara NOGA ZU	... ..	KU and NGA	NANG	AW or O	NAK
Namsang NOGA La sa	... ..	NGA	NANG	VO	a NYAK
Ao NOGA	... ..	NI	NA	OZV _o	te NUK
Lota NOGA	... {	A. ANA. ANI.	} NA	WO ro	NYIK
Mikir	... {	ICHI ISI & NE	} NANG	WO	a KUK
Dhimal	... ..	KA	NA	JIHA	DA'AKA
Mrung Bodo	... ..			HO	
BATTA of SUMATRA	... ..			
40 Dialects of MALAY	... ..			
HO	... ..	ING	UM	OE	HENDE
KOL Singhbhum	... ..	AING	UM	OE	HENDE
SANTALI	... ..	ING	AM	CHERE	HENDE
BHUMIJ	... ..	ING	AM	CHENE	HENDE
ORAON	... ..	ENAN	NI-EN	ORAK	MOKHARO
MUNDA	... ..	ING	AM	URE	HENDI
RAJMAHAL	... ..	EN	NIN	PUJ	MARGO
ANDAMANI	... ..	DOL			PUTUNGA
	{	NGA			
	{	NGAI			
AUSTRALIAN	... {	NGAII			
	{	NGAU			
	{	NGU			
	{	NGI			
	{	NGIE			

the following Languages.

not hard, as in "ANGER."

EAR	EYE	FISH	PIG	ROAD	WATER
A'NO	a MI	NGO	WO	LAWN	TUI
		HAKA			
NA	MIK	NYA	VAK	LAM	TI
NA	MIT	NGA	VAK	LAM	JO. CHO.
t' NA rong	te NUK	a NGO	AK	LEN. LEM	TZU
é NO	MHYEK	o NGO	WOK o {	LANG o LAM	} o CHU
i NO & AN	MEK	OK	PHAK	TOAR	? LANG
NHA	MI	HAIYA	PAYA	DAMA	CHI
KUNG jú	MA quá	A'A	WA	LAN	TEI
SUPING a	MATA			MOR DO LAN	
TELINGA	MATA	IKAN		GIA LAN	
LUTUR	MET	HAKU	SUKRI	HORA	DAH
LUTUR	MET	HAKU	SUKRI	HORRA	DAH
LUTUR	MET	HAKO	SUKRI	HOR	DAK
LUTUR	MET	HAI	SUKRI	HORREN	DAH
KHEBDA	KHAN	INJO	KIS	DAHARI	UM
LUTUR	MED	HAKU	SUKRI	HORAH	DHA
KHETWAY	KANE	MIN	KIS	SARKE	AM
IKPOKO	IDAL	YAT	ROGO	TINGA	INA
	MI				
	MIL				
	MII				
	MILA				
	MEUL				
	MILL				
	MI				

Comparison of Numerals

"NG "

		1	2	3	4	5
Tibetan, written	...	G'CHIG	g NYs	g SUM	b ZHI	hNA
Tibetan, spoken	...	CHIK	NYI	SUM	ZHYI	GNA
Burmese	...	TA	h NI t	th ONG	LE	NGA
Singpho	...	Al ma	N'KHONG	ma SUM	m'LI	m'NGA
Kunung	...	TI	a NI	a SAM {	aVLI } aBRI }	p'NGA
Kamti	...	NUNG	SONG	SAM	SI	HA
Mishmi D	{	KHING	KAI'ING	k'SANG	k' PRI	ma NGA
M M	{	K'MO	K'NING	k'SAM	km'BRIU	k'LIM
SHAI'YANG	{	TER	NYI	a UM	á PI	á NGA
MIRI	{	AKO	a NI	a UM	á PI	á NGA
Abor	...	AKO	a NI	an GOM	á PI	a NGO
Bhotia LHO	...	CHI	NYI	SUM	ZI	NGA
Changlo	...	THUR	NYIK	SAM	PHI	NGA
Kachari BODO	...	CHE SE	NAI NE	THAM	BRE	BA
Garó	...	SHA	g'NI	g'THOM	BRI	b'NGA
Hill Tippera	...	kai CHA	REMOI	k'THAM	B'ROI	BA
Khasia	...	WEI	AR	LAI	SAU	SAN
Kuki	...	KIA kar	P'NI kar	TUM kar	M'LI LE kar	ra NGA
Kumi	...	HNAK	NU	t'HUN	P'LU	P'ANG
Kyaw	...	KHAT	NIEK	t'HUM	m'LI	NGA
TAMIU	...	} HOK	NGI	CHAM	P'LI	NGA
? LEMYO	...		K'NA	SE	DA	p'NGU
Angami	...	PO	K'NA	SE	DA	p'NGU
Manipuri	...	AMA	a NI	a HUM	m'RI	m'NGA
Lushai		p'KAT	p'NI	p'TAM	p'LI	p'NGA
DZO						
Chin	...	HAw	NI	TUM	m'LI	NGO
Kacha NOGA	..	KAT	g'NA	g'JUM	m'DAI	m'NGA°
Banpara NOGA	...	é TA	á NI	á JUM	á LI	á GA
Namsang NOGA	...	van THE	van NYI	van RAM	b'LI	b'NGA
Ao NOGA	...	aKA	á NA	á SAM	P'LI p' zo	PaNGO
Lota NOGA...	...	é KHA	é NI	é THAM	m'ZOV	m'NGO
Mikir	...	i CHI	hi NI	k'THAM	ph'LI	pho'NGO
Dhimal	...	E long	NHE	SUM	DIA	NA
Mrung Bodo	..					
HO	...	MIAD	BARIA	APIA	UPUNIA	MOYA
KOL		Mi	BARIA	APIA	UPUNIA	MOYA
Singhbhum						
SANTALI	...	MIT	BAREA	PEA	PONEA	MO'RE'
BHUMIJ	...	MOY	BARIA	APIA	UPUNIA	MONAYA
ORAON	...	UNTA	en OTAN	man OTAN	NAKOTAN	PANJE- GOTANG
MUNDA	...	MIA	BARIA	APIA	UPNIA	MORIA
RAJMAHAL		ORT or				
Paharia		ONDONG	MAKIS	TIN	CHAR	PANCH
ANDAMANI	...	OBATUL	IKPAUR	nil	nil	nil

in the following Languages.

soft.

6	7	8	9	10	20		
DRUK THU	b DUN DUN	br GYUD GYE	dGU GUH	bCHU CHUH	NYI SHU NYI SHU		
KRU	SINIT	m' KAT	che KU	SI	KHUN		
KRU	SYEN	{ SYET KYAT }	tai GU	SAN	a NISAN		
HOK t'RA k TAM a KENG KENG a KYE TU	TSET } k'NIT k'NIT k'NANG DUN	PET P'NYI P'NYI P'NI GYED	KAU ko NANG NANG k'NIDE GU	SIP EYING } UYING } INGE CHU SE SHONG	SAU NYI. CHU KHAI- THUR		
KHUNG	ZUM	YEN	GU				
RO RA	SNI	JAT	ch KU	JI. ZI			
DOK	SNI	CHET	sh KU	s KANG	CHI- SKANG		
DOK DAU	SINI	CHA	ch KU	CHE	KHAI DE		
HINRIU	HINIEW	PHRA	KHYNDAL	SHIPHEW KHAD	AR'PHEW		
K'RU RU kar	SRE kar	RAI kar	GUO kar KHUA kar	T'SWOR kar SHOM	RU BUK		
t'RU	s' RU	té YA	t'KHAU	HORE' {	HORE' LAIK- HORE'		
o'RU	s' RI	RUET	KO	tc HU om	t CHOM NEK		
WOK	NYET	TSET	CHU	AN			
s'RU	t'NA	t'TA	t KWU	KER			
t'RU	t'RET {	NIPAN L	M'PAN L	TARA	KUL		
p'ROK	p'TSA ri	p'ri EK	p'KWA }	t'CHom	t'CHOM- NI		
SOK	SI	SE	KO	NGAHA	GO		
s'RU	s'NA	d'SAT	sh' GUI	g' REO			
á RUK	á NUT	á CHUT	á KU	á BN'			
i ROK	i NGIT	i SAT	i KHU	i CHI	RUAK- NYI		
t'ROK	TeNET	t'SET	TuKU	t'RA	METSV o		
t'ROK	t'ING t'SCANG	t'ZA	t'KU	t'RO	m'KWI		
th'ROK TU	thr' SHI NHI	nir KEP YE	chir KEP KUHA	KEP TE	KEPaKEP E BISA		
TURUIA	AIA	IRILIA	AREA	GEL			
TURIA	IYA	IRLIA	AREA	GELEA			
TURUI	EAE	IRAL	ARE	GEL			
TURUYA	SATH	ATH	NAU	DAS			
SEGOTAN	SATGO- TANG	ATE	NAU- GOTANG	DAS- GOTANG			
TURIA	SATH	ATH	NOKO	DAS GO			
CHAH	SATH	ATH	NAU	DAS			

The SECRETARY reported that the election of the Rev. J. L. Peach had been cancelled at the request of that gentleman who intimated that he would be shortly leaving India, and did not expect to return.

The SECRETARY read a circular from the Royal Society of New South Wales, enumerating prizes to be given for original researches on certain subjects connected with Australia. This can be seen in the Society's office.

Mr. C. Little moved that the Society should be registered under Act XXI of 1860.

The following papers were read :—

1. *Rough notes on the Grammar of the Language spoken in the Western Pānjāb*.—By TREVOR BOMFORD, C.M.S., MULTAN.

Communicated by the Philological Secretary.

(Abstract.)

In laying them on the table, the Honorary Philological Secretary, said, I wish to draw special attention to these notes, as one of the most important contributions to our knowledge of the Indo-Aryan Vernaculars, which has appeared during the past decade. Its importance lies not only in the value of the grammar, as illustrating an imperfectly known language, but as supplying a missing link which completes a chain of evidence materially affecting the hitherto accepted theories regarding the classification of the modern Indo-Aryan languages.

The points of similarity which exists between the Kāçmīrī and Sindhī languages has been noted incidentally by Dr. Bühler, and by the present speaker, but it has not been easy to explain satisfactorily the evident relationship which exists between them, for till Mr. Bomford's *Rough Notes* were received, the territories in which these two languages were spoken were believed to be separated by many hundred miles of country, inhabited by a population speaking a totally different language—Pañjābī. There was no historical or territorial connexion between these two widely separated, but closely connected, languages.

Mr. Bomford's *Rough Notes* have changed all this. We have hitherto known a so-called dialect of Pañjābī called Multānī, which has been well illustrated by the late Mr. O'Brien's *Multānī Vocabulary*. This has hitherto been localized in the south of the Pañjab, round Multān, in the districts bordering on Sindh, and, as it bore many close points of resemblance to Sindhī, it was assumed, on the information then available, to be a sort of border dialect, through which Sindhī merged into

Pañjābī. Mr. Bomford now shows that what has hitherto been called Multānī, from the place where it was first observed, is not a border language between Sindhī and Pañjābī at all. It is the language of the Pañjāb, west of, roughly speaking, the Jhelum, till it meets the Pashtu spoken west of the Indus. Pañjābī has hitherto been measured by the standard of Amritsar, a town some forty miles East of Lahore, midway between the Rāvī and the Satlaj, and our grammars, dictionaries, and literature have been based entirely on the language of the East of the Pañjāb. The Grammars stated, and it was known as a general fact, that the language of the Western Pañjāb differed from that of the East, but few attempts, till Mr. Bomford undertook the task, were made to investigate the points of difference, and it was too readily assumed that Pañjābī had two dialects,—a Standard and a Western. Mr. Bomford's grammar shows that this is not true. That *Western Pañjābī can in no sense be called a dialect of standard Pañjābī, but is altogether a distinct language closely connected with, and forming the connecting link between Sindhī and Kāçmīrī.*

These three languages, Sindhī, Western Pañjābī, and Kāçmīrī, can now be classed as forming a North-Western Family of Indo-Aryan Vernaculars, markedly differing from what has hitherto been called the Western, but must now be called the Central Family, and having curiously intimate relations with the Eastern language of Assam and with the Aryan languages spoken in the provinces of Bengal, Bihār and Orissa.

This interesting fact opens out wide ethnological questions, on which I am now engaged, and I hope, at an early date, to be able to place the result of my researches before the Society.

This paper will be published in the *Journal*, Part I.

2. *On a case of Aghorpanthism from the Sāran District, Behar.*—By BĀBU SARAT CANDRA MITRA. Communicated by the Anthropological Secretary.

3. *Eastern Nagas of the Tirap and Namtsik.*—By S. E. PEAL, ESQ.,
These papers will be published in the *Journal*, Part III.

4. *Susuniā Rock Inscription of Candra-varman.*—By NAGĒNDRA-NĀTHA VASU.

This inscription has been found on the Susuniā hill, in the district of Bānkurā, 12 miles to the north-west from the head-quarters and 17 miles south-south-west from the Rānīgāñj Station of the East India Railway. Passengers travelling by that Railway past the stations of Durgāpur, Ondal and Rānīgāñj, see the hill with its two peaks towards the south-south-west verge of the horizon, like the head and back of a huge elephant facing the west. The whole hill from the

base to the highest summit is covered with a dense jungle of various forest trees, some of which may produce good timber; but the hill being subject to the usual annual burning, the trees suffer much from the fire, and are little used except for fuel and for the framework of the thatched houses.

This hill together with Bihārī-nāth, Pachtte and several other hills, forms the eastern outskirt of the Vindhya ranges, the Susuniā hill being the easternmost extremity. The whole hill is formed of a fine kind of sandstone which is especially valued for paving purposes, known in the trade as Burdwan paving stones. A few years ago its quarries brought a considerable sum to its proprietors, but during recent years stones of a superior quality having been dug at a place near the B. N. Railway the Susuniā stone trade has greatly fallen off.

A branch of the Ahalyā Bāi's Road passes by the western side of the hill from Chatnā to Rānīgañj. At a little distance to the east from the road and at the south-western base of the hill, there is a perennial spring called Dhārā and some ancient sculptures, the principal one being that of Narasimha (an incarnation of Viṣṇu). An annual fair is held there on the Vārūṇī festival, on the 13th day of the dark fortnight of the month of Caitra. But the chief object of interest to which I endeavour to draw the attention of the meeting is the Inscription on the hill, which though so near to the metropolis and to a first class Railway Station, has not received the notice it deserves from any of our former worthy antiquarians. I here give a brief account of it, which, though insufficient, will, I hope, give an idea as to the nature and contents of the inscription.

I was first informed of it last January, by my friend Bābū Gōpī Nāth Karmakār, who told me that there was an inscription on the north-east side of the Susuniā hill, which the people of that locality regarded as the work of the Dēvas, written in three lines in three different Dēvākṣaras, *i.e.*, characters of the Dēvas. They also believed it to have existed there from time immemorial, and that none can read it, and that, if perchance some *sādhu* (sage) did come and read it, he would not disclose its contents to the people in general, who are deemed unprivileged to hear its sacred teachings. I at once concluded that this must be some ancient inscription, and requested my friend to send me an impression of it. Accordingly he went to that place, but being unable to procure an impression of the inscription, which he reported to be too large for his materials then at hand, he sent me the annexed hand-copy, with a brief description of the locality, nature of the inscription, &c., promising, however, to procure a faithful impression in ink when required. Trusting to get it shortly I have ventured to make the copy and my reading of it, the subject of my present paper.

The spot, where the inscription is situated, is on the north-eastern side of the hill nearly half way to the summit, above a perennial mountain-spring which among the people of the locality goes by the name of Yamadhārā or Damdhārā, in order to distinguish it from the more important spring Dhārā to the south-west extremity, which has been already mentioned. The place commands the view of a tract of land towards the north as far as Rānigañj, spotted with innumerable villages, ponds, gardens, cornfields, jungles, &c. Tradition runs, that this place was the grotto of Virūpākṣa Ṛṣi, who lived there in ancient times. Some also believe that even now he lives invisible in the mountain, and others say that some fortunate villager sometimes descries him as an old man with a long white beard and grey hair, roving early in the morning over the hill bright as the sun, singing angelic songs, but vanishing at the approach of man.

The inscription is on the vertical side of a cliff facing the west. The surface is smooth and there are no fissures visible. The inscription is written in three lines, with a symbolic ornamented circle at the top. Almost the whole is in an excellent state of preservation. The letters are cut deep and clearly by the hand of a skilful engraver. The average size is nearly 4." The characters belong to the class which Dr. Fleet calls 'the North Indian Alphabet of the 4th century A.D.' All the letters closely resemble those of the 'Mecharauli Posthumous Iron Pillar Inscription of Candra,' first brought to notice in our Society's *Journal* in 1834, and subsequently published in other numbers, and lately by Dr. Fleet in his *Corpus Inscriptionum Indicarum*, Vol. III, plate XXI A.

In respect of orthography the only points deserving of notice, are the doubling of *k* followed by *r*, as in line 1 in *Cakra-svāminah*, and the doubling of *m* preceded by *r*, as in line 2, in *patēr mmahārāja*. The language is Sanskrit and the version prose.

The circle at the top with its adjuncts represents, I think, the bright discus (*cakra*) of Viṣṇu, whose name as *Cakra-svāmin* appears at the commencement of the inscription.

Regarding the posthumous inscription of Candra in the Mecharauli pillar, Dr. Fleet says:—

'My own impression at first on independent grounds, was to allot it to Candragupta I., the first Mahārājādhirāja of the family, of whose time we have as yet no inscription, and I should not be surprised to find any time that it proved to belong to him. The only objection that I can see, is that it contains no reference to the Indo-Scythians, by overthrowing whom the early Guptas must have established themselves.' (Fleet's *Corp. Ins. Ind.* III. p. 140 n.).

But it appears to me that the *Candra* of the Meharaulī pillar, is no other than the *Candravarman* of the present inscription. This conjecture is supported by the fact, that *Candra* of the Meharaulī inscription was a Vaiṣṇava (worshipper of Viṣṇu) who had erected a *dhvaja* or standard of the god Viṣṇu as the inscription states, and that he had carried on war with the kings of Vāṅga (Bengal), and, crossing the seven mouths of the Sindhu (Indus), had conquered the Vāhlikas of Bactria or Balkh. Now in order to fight with the Kings of Vāṅga, probably he had to pass over the region in which stands Susuniā hill, and it may be surmised that like the *dhvaja*-erection, he symbolized the *Viṣṇu-cakra* on the Susuniā hill, and left the inscription to commemorate it.

In the Allahabad posthumous pillar inscription of *Samudra-gupta*, he is said to have defeated *Candra-varman*, a powerful king of the North India. This again leads us to imagine that *Candra-varman*, son of Mahārāja Siddha-varman, styled as the Lord of the Puṣkara lake (in Ajmēr), of the present inscription reigned as a powerful king, and at one time waged a furious war throughout the whole of Northern India, from Bengal in the east to the Punjab in the west, and at last was defeated by *Samudra-gupta*.

Transcription.

- | | |
|---|--|
| 1 | चक्रस्वामिनः दासाग्रेणातिष्ठतः |
| 2 | पुष्कराम्बुधिपतेर्महाराजश्रीसिद्धवर्मणः पुत्रस्य |
| 3 | महाराजश्रीचन्द्रवर्मणः कृतिः । |

English Transliteration.

1. Cakra-svāminah dāsāgreṇātisṛṣṭah.
2. Puṣkarāmbudhi patēr mmahārāja-Çrī-Siddha-varmmanah putrasya.
3. Maharāja-Çrī-Candra-varmmanah kṛtiḥ.

Translation.

Dedicated by the chief of the servants of the Lord of the discus (Viṣṇu).

The work of the illustrious *Candra-varman*, son of the illustrious *Siddha-varman*, the Lord of the Puṣkara Lake.

5. *Ternary : its divinity.*—By S. C. LAHARRY, ESQ.

The paper will be published in the *Journal*, Part III.

LIBRARY.

The following additions have been made in the Library since the Meeting held in August last.

TRANSACTIONS, PROCEEDINGS AND JOURNALS,

presented by the respective Societies and Editors.

- Batavia. Bataviaasch Genootschap van Kunsten en Wetenschappen,—
Notulen, Deel XXXIII, Aflevering 2.
- . ———. Tijdschrift voor Indische Taal-, Land-en Volken-
kunde, Deel XXXVIII, Aflevering 5.
- . ———. Verhandelingen, Deel L, 1ste Stuk.
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Natuurkundig Tijdschrift voor Nederlandsch-Indië, Deel LIV.
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- Berlin. Königlichen Akademie der Wissenschaften zu Berlin,—
Abhandlungen, 1894.
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Tome XVIII.
- Buenos Aires. La Academia Nacional de Ciencias en Córdoba,—
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- Budapest. A Magyar Tudományos Akadémia,—Ertekezések, Kötet
XVI, Szám 4-5.
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3-4; XXIV, 1-4; XXV, 1-2.
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 ———. Microscopical Society of Calcutta,—Bulletin, Vol. IV, Nos. 5 and 6.
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- London. The Academy,—Nos. 1212-24.
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- . Geological Society,—Quarterly Journal, Vol. LI, Part 3.
- . Institution of Electrical Engineers,—Journal, Vol. XXIV, No. 118.
- . Nature,—Vol. LII, Nos. 1343-55.
- . Royal Asiatic Society of Great Britain and Ireland,—Journal, Vol. XXVIII, No. 4.
- . Royal Astronomical Society,—Monthly Notices, Vol. LV, No. 8.
- . Royal Geographical Society,—Geographical Journal, Vol. VI, Nos. 2-4.
- . Royal Society,—Philosophical Transactions, Vol. CLXXXV, A and B, Parts 1-2.
- . ———. Fellows, corrected up to November 30th, 1894.
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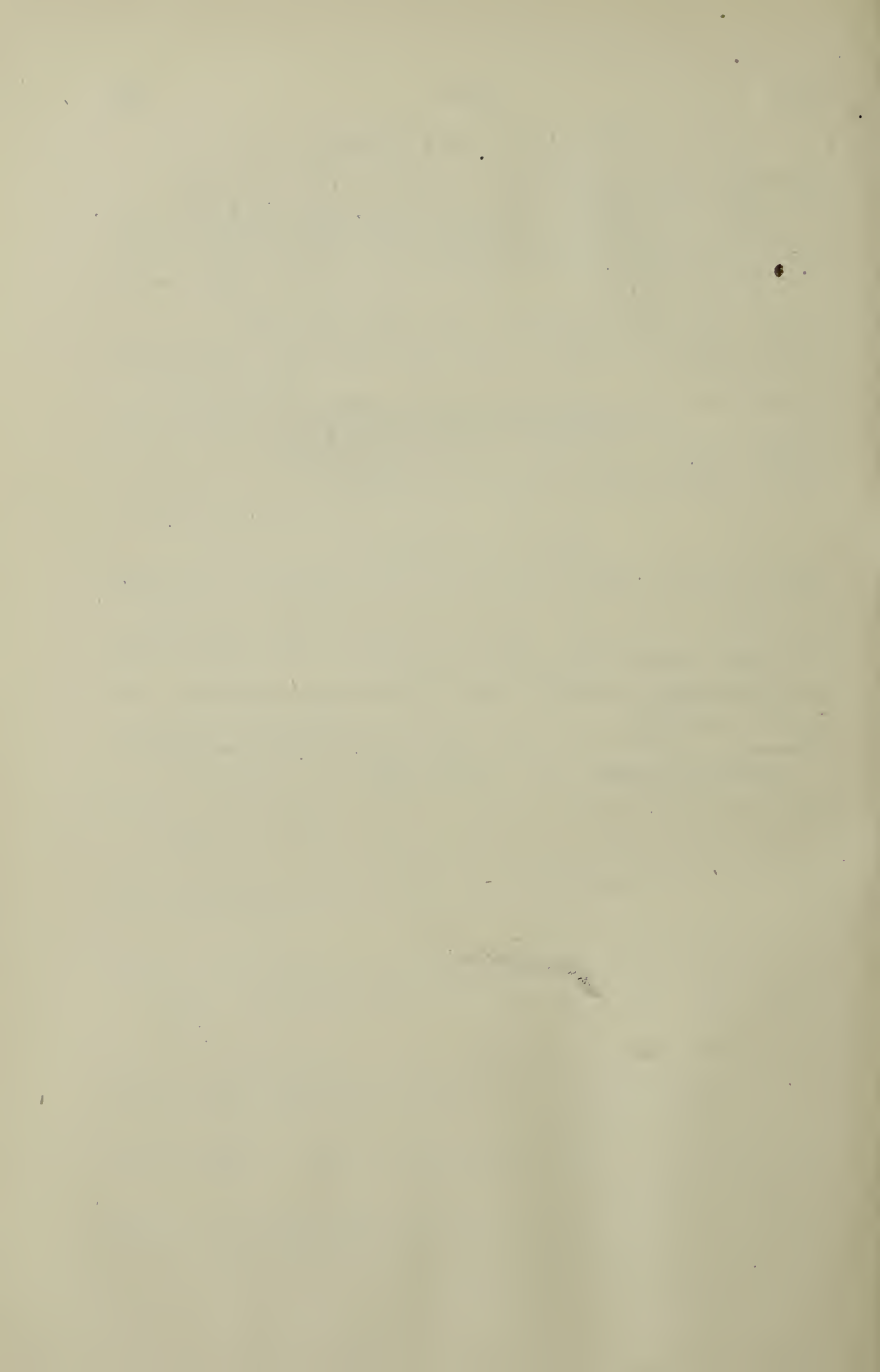
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PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR DECEMBER, 1895.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday, the 4th December, 1895, at 9 P.M.

ALEXANDER PEDLER, F. R. S., President, in the chair.

The following members were present:—

H. K. W. Arnold, Esq., J. C. Bose, Esq., P. J. Brühl, Esq., F. Finn, Esq., Dr. G. A. Grierson, A. Hogg, Esq., C. Little, Esq., Bābu Pañcānana Mukerjee, L. de Nicéville, Esq., J. D. Nimmo, Esq., C. A. Oldham, Esq., Dr. D. Prain, Bābu Mahendranāth Rāy, Dr. P. C. Ray, Paṇḍit Hara-prasād Ḍastri, Bābu Nagēndranātha Vasu, C. R. Wilson, Esq.

Visitors:—C. W. Odling, Esq., Babu Asutosh Ray.

The minutes of the last meeting were read and confirmed.

Thirty presentations were announced, details of which are given in the Library List appended.

The following gentlemen duly proposed and seconded at the last Meeting of the Society were balloted for and elected Ordinary Members:—

J. Kennedy, Esq.,
Charles Swift Delmerick, Esq.
Pandit Harimohan Vidyabhushan.

The following gentlemen are candidates for election at the next Meeting:—

R. Paget Dowhurt, Esq., proposed by Dr. G. A. Grierson, seconded by C. R. Wilson, Esq.

Richard Burn, Esq., I.C.S., proposed by Dr. G. A. Grierson, seconded by C. R. Wilson, Esq.

G. Place, Esq., I.C.S., Judge, Chapra, proposed by Dr. G. A. Grierson, seconded by C. R. Wilson, Esq.

Dr. Arnold Caddy, proposed by Dr. W. J. Simpson, seconded by Dr. G. Ranking.

The following gentleman has expressed a wish to withdraw from the Society.

Dr. O. C. Raye.

The Natural History Secretary read obituary notices of the deaths of Monsieur Louis Pasteur and Prof. T. H. Huxley.

Louis Pasteur was born in 1822 at Dôle, in the Jura. His education commenced at the Communal College at Arbois, and he passed into the E'cole Normale in 1843. Here he studied chemistry under Balard, and at the Sorbonne under Dumas, showing remarkable application. It was in the E'cole Normale, under Delafosse, that he commenced that study of molecular physics, which led up to his first important work, the investigation on the isomeric crystals of the tartrates and paratartrates of soda and ammonia. This work was interrupted by his appointment as Dean of the Faculty of Sciences at Lille; here the chief industry of the town was the manufacture of alcohol, and Pasteur, desiring to improve it by scientific methods, took up the study of fermentation. The change of subject was not so great as it seems, for in his study of the tartaric salts he had observed cases in which fermentation had seemed due to the presence of a living organism. Now, combining chemistry and microscopy as they had hardly ever been combined before, he succeeded in proving that fermentation generally is due to the action of organisms living in the fermenting substance. More, he showed that each method of fermentation, vinous, putrefactive, or otherwise, was due to a specific micro-organism appropriate to that method. Most important of all, Pasteur's investigations shewed that each species of ferment may be isolated and cultivated separately, and in certain instances be so modified by cultivation as to exert but relatively slight influence on substances which it would naturally strongly affect. The most direct applications of these results were, naturally, made in the manufacture of wine and vinegar and later on of beer, the so-called diseases of which, being traced to the disturbing influences of other micro-organisms mingled with those of the true alcoholic ferment, pure yeast, could now be prevented, for instance by the heating process known specially as Pasteurization. Hence accrued a great gain to the wine and beer industries; but the utility of the proof that

fermentations, including the putrefactive, are directly due to micro-organisms, soon received a more important demonstration. The study of the diseases of fermented liquids led straightway to the practice of antiseptic surgery, now so universally applied. Very few years later the whole subject of the complete exclusion of micro-organisms was exhaustively studied by Sir Joseph Lister, and afterwards by others, to the end of the saving of thousands of lives, and the rendering possible of many operations which before could hardly be attempted. Pasteur would have proceeded to carry out in relation to diseases the great general principle that he had established, but now he was forced to change somewhat the nature of his inquiry, being urged in 1865 by Dumas to undertake the investigation of a disease of silkworms in the south of France, which was seriously threatening the silk industry. The existence of "corpuscles" in the diseased insects and eggs had already been reported, and Pasteur, while making a careful investigation of the whole disease, directed his chief studies to these. He found that these disease-germs were passed on in the eggs, and invented a plan of testing for disease in the breeding moths, which, being practically followed, has proved effectual in putting a stop to the plague. After four years spent in investigating this subject, Pasteur had a dangerous paralytic stroke, in consequence of which, and of the miseries of the Franco-German war, which shortly followed, he was debarred for some time from any original work. On the end of the war he first betook himself to a study of the diseases of beer on the same lines as he had adopted in his previous researches on those of wines, and then devoted himself to that field of research in which he has won his greatest fame—the study of those diseases of animals which might be supposed to originate from virus generated by various micro-organisms. Davaine had acquired evidence of the dependence of anthrax on the presence of organisms in the blood of infected animals, but his work was not well received till Pasteur proved its correctness, and then still further extended his researches. Most important of all, besides ascertaining the appropriate micro-organisms of several diseases, he found various means of cultivating these germs; these he separated, multiplied, and tested their influences under various conditions of environment, or after changes had been induced in themselves. Most fruitful was the discovery thus made of the possibility of attenuating, or mitigating gradually, by various culture-processes, the virulence of morbid bacteria till they can without harm be introduced into the blood of an animal which under normal conditions would rapidly succumb to their effects. And it was shown that some of these inoculations had the same effect as vaccination, giving the disease in a milder form and along with it protection against a severer attack.

The principle was first tested practically with fowl-cholera, and then with swine-erysipelas; but Pasteur has also applied it to anthrax, and as all are well aware, to rabies. So far-reaching is it that the debt of humanity to Pasteur becomes immense, even should the efficacy of inoculation treatment yet be considered doubtful in certain cases. But the great bacteriologist's own researches have been cut short, though he has been more fortunate than many in living to see them bear such ample fruit. Though since his paralysis he had enjoyed fairly good health, in 1887, he developed symptoms of heart and kidney disease, and four years ago he had influenza, resulting in yet further weakness. Last winter work was impossible for him, and though he went for the present summer to Garches, near St. Cloud, still with an eye to his labours, in the early part of September he himself appears to have been conscious of his approaching end, and on September 28th that end came.

Of his numerous honours we need only speak here of those our own countrymen have bestowed upon him. In 1856, he received the Rumford Medal from the Royal Society of London, for his researches on the polarisation of light, and in 1869 he was made a foreign member of the Society, receiving in 1874 the Copley Medal, which was awarded to Huxley in 1888. We may congratulate ourselves, as members of the Royal Asiatic Society, on having elected the founder of bacteriology as an Honorary Member of our body during the past year.

Thomas Henry Huxley was born at Ealing in 1825. His scientific training began at Charing Cross Hospital, where he joined the medical school in 1842. Even while here he distinguished himself by a brief notice in the *Medical Times and Gazette* of that layer in the root-sheath of hair which has since borne his name. Passing his M. B. Examination in 1845, he took the second place in honours in Anatomy and Physiology, and after practising for some time among the poor in London, he joined the Royal Naval Medical Service. Thus he came to occupy the post of Assistant-Surgeon to H. M. S. *Rattlesnake* then about to start on a surveying voyage to the South Seas. The voyage, during which the Inner route between the Barrier Reef and the East Coast of Australia and New Guinea was surveyed, and the world circumnavigated, occupied four years. So ample was the use that Huxley made of the opportunities thus afforded, that his communications, and the evidence of ability which they furnished, led to his election into the Royal Society in the year after his return. Two years later, Huxley left the naval service, and in 1856 succeeded Edward Forbes as Professor of Natural History in the Royal School of Mines, a post which he continued to hold till his retirement from all official work

ten years ago. This was not however, his only scientific post. He was twice Fullerian Professor of Physiology to the Royal Institution; and in the same year in which this honour first fell to him, was appointed Examiner in Physiology and Anatomy to the University of London. Four years later, in 1858, he delivered the Croonian Lecture of the Royal Society, choosing for his subject the "Theory of the Vertebrate Skull." For six years he was Hunterian Professor at the Royal College of Surgeons, and twice he presided at the British Association, first in 1862 over the Biological Section at the Cambridge meeting, and eight years later, at the Liverpool meeting, over the Association as a whole. In 1869 and 1870, he was President of the Geological and Ethnological Societies, and for three years he was Lord Rector of Aberdeen University. Elected Secretary of the Royal Society in 1873, he was called ten years later to the highest honour of English Science, the presidency of that body. He occupied the place of Sir Wyville Thomson as Professor of Natural History of Edinburgh, during that naturalist's absence with the *Challenger*, and for four years acted as Inspector of Salmon Fisheries. All his official posts, however, as above stated, were resigned by him in 1885, after which he retired to Eastbourne; but more than six years after his retirement, he received the dignity of Privy Councillor. His honorary degrees and memberships are too numerous to mention, though it must here be remarked that he was elected an Honorary Member of the Royal Asiatic Society of Bengal as early as 1872. After his retirement, Huxley lived a quiet but by no means inactive life, but latterly his health failed, and after more than a year's illness, he died on June 29th, 1895. His work lay in more departments than one, and in each of these he occupies an exceptional position. As Biologist, whatever his rank will in the future be decided to be, he will at any rate be reckoned as one of the foremost of the century. Of wide interests, he undertook research in many Invertebrate and Vertebrate groups, and shed enlightenment on all. Most noteworthy, perhaps, was his work on the Comparative Anatomy and classification of the Vertebrata, to which he paid particular attention. In the second place, as a philosophic thinker, Huxley is universally acknowledged to have held a high position. On many questions he has profoundly influenced modern thought, and in none so much as in that relating to the theory of Evolution. Of the views of Darwin and Wallace he was, if not the earliest, certainly far the most brilliant supporter. As early as 1863 his lectures to working men, begun in 1860 at the Jermyn Street Museum, were published under the title "Evidence as to Man's place in Nature," and excited great interest both at home and abroad. Not only did he advance the Darwinian principles in this and other works, but himself worked out many important developments thereof.

His exceptional qualities as a controversialist are well known and were often called forth in defence of the evolution hypothesis and in theological disputes; while as a writer of English, no one of his time has surpassed Huxley. Clearness of writing was his especial aim,—an aim which all must admit he has worthily attained. Perhaps, indeed, his greatest fame will hereafter rest on his qualities as a teacher. The extension of scientific knowledge was to him as important an object as its acquisition, and he fully recognized the extreme difficulty of, as he himself said, “the task of putting the truths learned in the field, the laboratory, and the museum, into language, which, without bating a jot of scientific accuracy shall be generally intelligible. His desire for the extension of scientific knowledge and methods, according to his own statement, rested on the conviction that there is no alleviation for the sufferings of mankind except veracity of thought and action. With the intent of promoting these objects he was content to subordinate any ambition he possessed for scientific fame to other ends, and he would have been content to be remembered, or even not remembered, as one of many who had worked for the popularization of science, the development and organization of scientific education, and the maintenance of opposition to clericalism of whatever denomination. That he will meet with the former alternative, of remembrance, and of remembrance as an ideal hero of science, will be the opinion of all who have paid even the slightest attention to his work and writings.

Dr. D. Prain exhibited a monstrous Papaya and made the following remarks.

A Case of Pleiotaxy of the Gynæcium.—By D. PRAIN.

(With Plates IV and V.)

Pleiotaxy of the gynæcium, or an increase in the number of whorls of which the pistil consists, occurs so infrequently that an undoubted instance is not unworthy of record. The present example, which occurred in a *Papaya* fruit that came to table in the ordinary way as dessert, was sent to the Royal Botanic Garden by Mr. J. S. Gladstone. It is an excellent instance of the condition spoken of as “a fruit within a fruit.”¹ Of this condition there may be two explanations. An adventitious fruit may occur within the ovary so as to occupy the position usually occupied by a seed. This is by no means an uncommon occurrence and, among recorded instances, is well-figured by Dr. Masters (*Veg. Teratol.* p. 182, f. 94, 95) from an example in Wall-flower pods,

¹ *Gardener's Chronicle*, i. (1882) p. 11 and p. 601.

by Mr. Duthie (*Gard. Chron.* i, 1882, p. 601, f. 95) from examples in the pods of Indian Mustard and by Dr. Masters (*Veg. Teratol.* p. 183, f. 96, 97) from examples in Grapes. Dr. King tells me that he has observed something approaching the same peculiarity in the Papaya itself; one or more of the seeds have been replaced by miniature Papayas projecting into the ovarian cavity.

Here, however, we have to deal with a different phenomenon. Inside the perfectly normal-looking fruit we find a second, about half its length, quite unconnected with the carpels of the ordinary pistil and arising from the axis of the flower within the normal ovary and therefore above the point of attachment of its parts. The edges of the carpellary leaves of this second ovary are more or less free except at the base; through the interstices we can see a third ovary proportionately smaller but rather more approaching the normal ovary in appearance and structure owing to its component carpels being united except at their tips. (Pl. IV, fig. A.) This third ovary we find to be from the second as the second is from the first; it occupies apparently as free the very extremity of the axis of the flower. (Pl. V, fig. B.)

The degree of solution of carpels in the more external of these accessory fruits is rather irregular. Two carpels are united throughout; two others are discrete only in their upper fourth. These two pairs are *inter se* discrete to within half-an-inch from their base; the solitary carpel on the other hand, is united throughout its lower third to each of its neighbours. The carpels of this whorl are alternate with those of the normal ovary; those of the innermost whorl are in turn alternate with the ones of the whorl just outside and are therefore opposite the normal carpels. (Pl. V, fig. C.) The multiplication of carpels here met with is obviously not due to *substitution* of carpels for organs of some other kind and is not easily explicable on the theory that there has been a *chorisis* of the normal carpels.

The stigmas of these extra carpels appear to be perfectly normal, but being confined within a closed cavity pollination has been impossible and the perfectly normal ovules that cover the placentas have remained undeveloped. Owing to the pressure exerted by the accessory carpels seeds are absent, excepting on the spaces opposite the gaps between these adventitious organs, from the lower two-thirds of the normal fruit. In the upper third where there has been no pressure perfect seeds are present as usual.

The discrete character of the outer accessory carpels will recall to mind the appearance presented by the "finger orange," in which there is, besides the separation of the ordinary ones, not infrequently an augmentation in number of carpels. This at times is due apparently

to stamens becoming converted into carpellary organs; not always, however, for at times there is an increase in number of carpels without any alteration of stamens or of other organs. But the presence of a complete axially situated orange within another has not, I believe, been recorded.

Though very uncommon, the condition just detailed, which is the second way in which the existence of a fruit within a fruit may be explained, is nevertheless not novel. An excellent account of a precisely parallel case has been given by Dr. Masters (*Gard. Chron.* i, 1882, p. 11, f. 1), who records the phenomenon as occurring in *Tropidocarpum* an American *Crucifer*. In that instance a small ovary occupied, as in the present case, the very extremity of the flower-stem within the normal seed-vessel. And it is possible that the condition of affairs in what is known as the St. Valery apple may be of the same nature, though another explanation has been offered of the structure in this case and it must be admitted that there, as in the case of the Love-apple where too an adventitious series of carpels is occasionally produced, the adventitious one is intimately combined with the primary series.

As showing the rarity of the condition it may be mentioned that the *Tropidocarpum* example appears to have been the first that Dr. Masters, our greatest authority on teratological questions, had met with; if any similar condition has since been recorded, the record has escaped my attention.

In the *Gardener's Chronicle* instance only one accessory carpellary whorl is present; here there are two. Partly on this account therefore, and partly owing to the rarity of the condition, but chiefly because the phenomenon is here so obvious and the abnormal organs are so tangible—the accessory ovary in this *Papaya* measures three inches in length, that of *Tropidocarpum* only as many lines—it seems worth while recording this instance of pleiotaxy of the gynœcium.

The Philological Secretary exhibited two photographs of the inscription on a rock in the Brahmaputra forwarded by Mr. E. A. Gait.

The following papers were read:—

1. *Discovery of a copper plate grant of Viçvarūpa, one of the Sēna kings of Bengal.*—By BABU NAGENDRANATHA VASU.

(Abstract.)

In the village Madanapāḍa, Post Office Pinjāri, Parganāh Kōṭālī-pāḍa of the Farīdpur District, a peasant while digging his field found a

copper-plate and made it over to the land-holder, who kept it in his house. This plate was made over to me by Paṇḍita Lakṣmi-candra Sāṁkhyatīrtha in 1892, and I noticed the contents of this inscription and published a facsimile of the whole plate in the *Viçvakōṣa*, but this is the first time that I publish the entire text.

It has a curvature at the top bearing a ten-handed image of Sadāçiva, similar to that in the grant first brought to notice in the *Society's Journal* by J. Prinsep in 1838 (Vol. VII., Part I., p. 42).

The characters may be described as Bengali of the 12th or 13th century A.D., and they resemble closely the characters of the Dēopādā inscription of Vijaya-sēna.

The inscription opens with an invocation of Nārāyaṇa, of the Sun and of the Moon. It then relates that:—

From this famous lineage (of the Moon) sprung Sudhā-kiraṇa-çēkhara (Çiva) in the shape of Vijaya-sēna. From him was born a very powerful king named Ballāla-sēna. From him sprung a son named Lakṣmaṇa-sēna; his son was Viçva-rūpa. The object of this plate is to record the grant of certain lands within the limits of Vikramapura to the Çrutipāṭhaka (the reader of the Vēdas) the illustrious Viçvarūpa-dēva-çarman of the Vātsya gōtra, a great-grandson of Parāçara-dēva-çarman, grandson of Garbhēçvara and son of Vanamālī, in the month of Bhādra of the 14th year; effected by the illustrious Kōpiviṣṇu, the chief officer of peace and war in Gauḍa; (engraved) on the first Āçvina of the year 14.

One of the important points for notice in connection with this inscription is the distinctive titles of the four Sēna Kings which have, I believe, hitherto escaped the notice of antiquarians; thus:—Mahārāja Vijaya-sēna-dēva was styled Vṛṣabha-çaṅkara-gauḍēçvara, his son Mahārāja Ballāla-sēna-dēva, Niḥçaṅka-çaṅkara-gauḍēçvara, his son Maharāja Lakṣmaṇa-sēna-dēva, Madana-çaṅkara-gauḍēçvara (L. 35), and his son Mahārāja Viçvarūpa-sēna-dēva, Vṛṣabhāṅka-çaṅkara-gauḍēçvara.

The contents of the grant published by Prinsep as that of Kēçava-sēna, agree closely with those of the grant under review, with this exception that the place, where the name of the pseudo-Kēçava-sēna occurs in the grant, is in such a condition as to show that originally some other name had been inserted in the place of that of Kēçava-sēna. This circumstance led Prinsep to believe that at the time of the copper-plate being engraved, Kēçava-sēna's elder brother Mādhava-sēna suddenly expired, and that his name was erased from it and that of his brother. But in the face of the copper-plate grant under review, Prinsep's inference can scarcely hold good. The reading moreover of Prinsep is not correct. The correct reading of the 10th verse, published by him according to the facsimile of the original grant of the 3rd year,

and also as shewn in the newly discovered grant of the 14th year (line 17) is as follows :—

Etasmāt kathamanyathā ripu-vadhū-vaidhavya-baddha-vratō.
Vikhyāta-kṣitipāla-maulir abhavat Ṣrī-viṣvarūpo nṛpaḥ.

It is evident from the above ṣlōka that both the plates have the name of Viṣva-rūpa. The marks in the two places in the copper-plate of the 14th year exactly tally with those of the other copper-plate of the 3rd year. The name of Viṣva-rūpa is clearly inscribed on this plate in lines 17, 22 and 38. In both the grants, the name of Viṣva-rūpa, as marked in the last two places, seems to me to be the Royal sign-manual.

The paper will be published in full in the *Journal*, Part I.

2. *On Pronominal Suffixes to the Kāṣmīrī Language.*—By DR. G. A. GRIERSON.

The paper will be published in the *Journal*, Part I.

3. *On Mercurous Nitrite.*—By DR. P. C. RAY.

4. *Noviciae Indicae, X. Some additional Fumariaceae.*—By D. PRAIN.

The papers will be published in the *Journal*, Part II.

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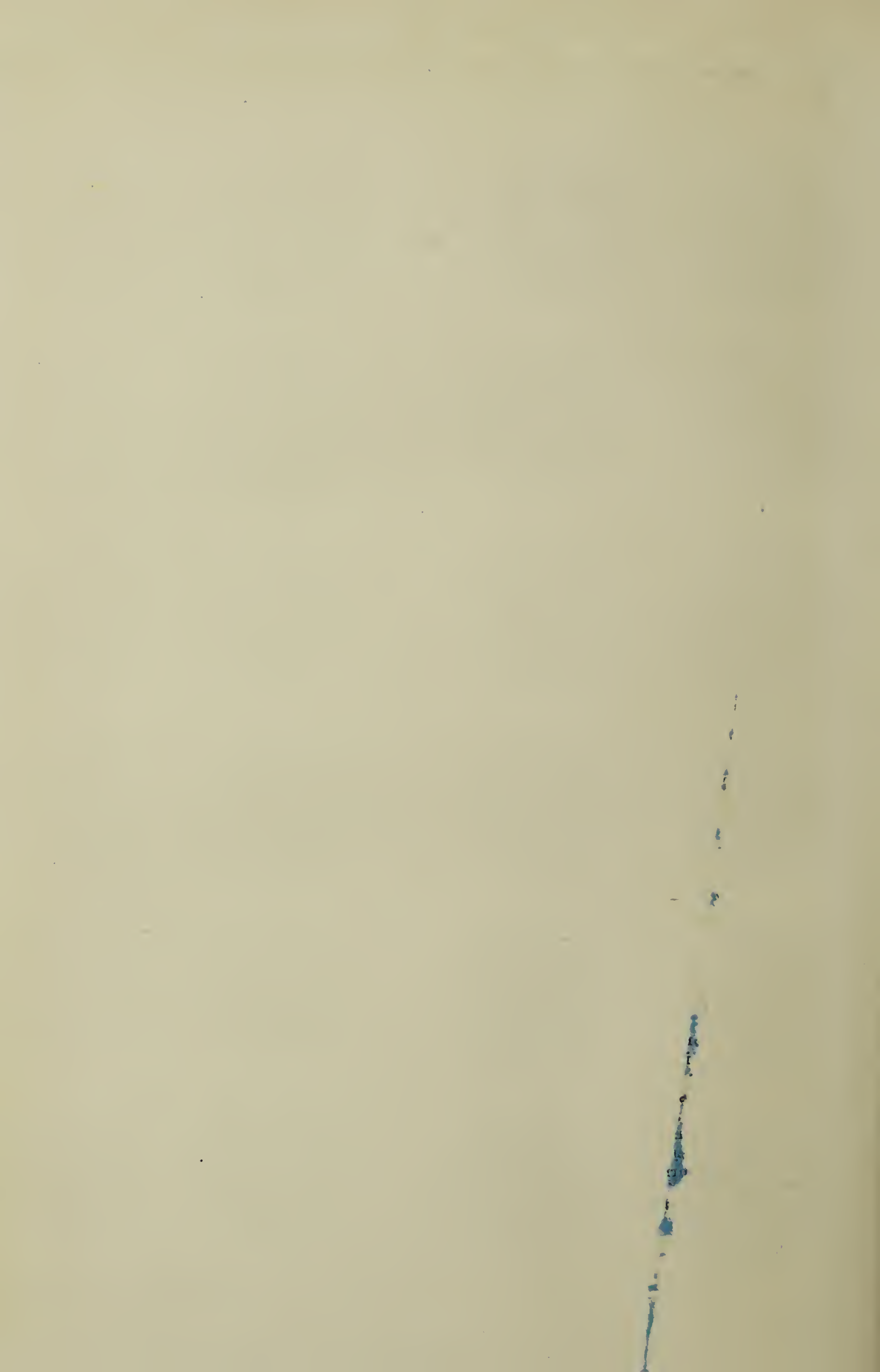




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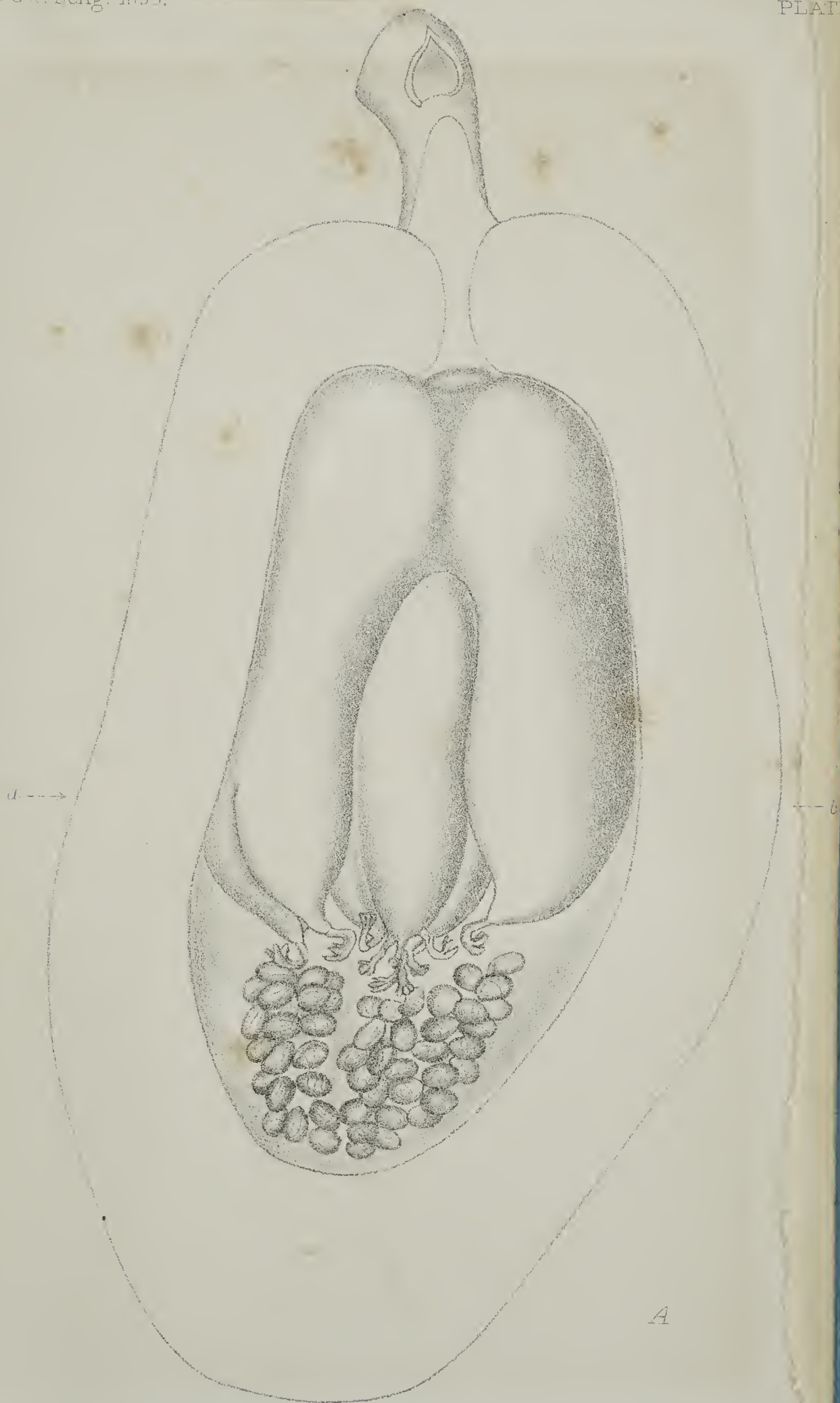


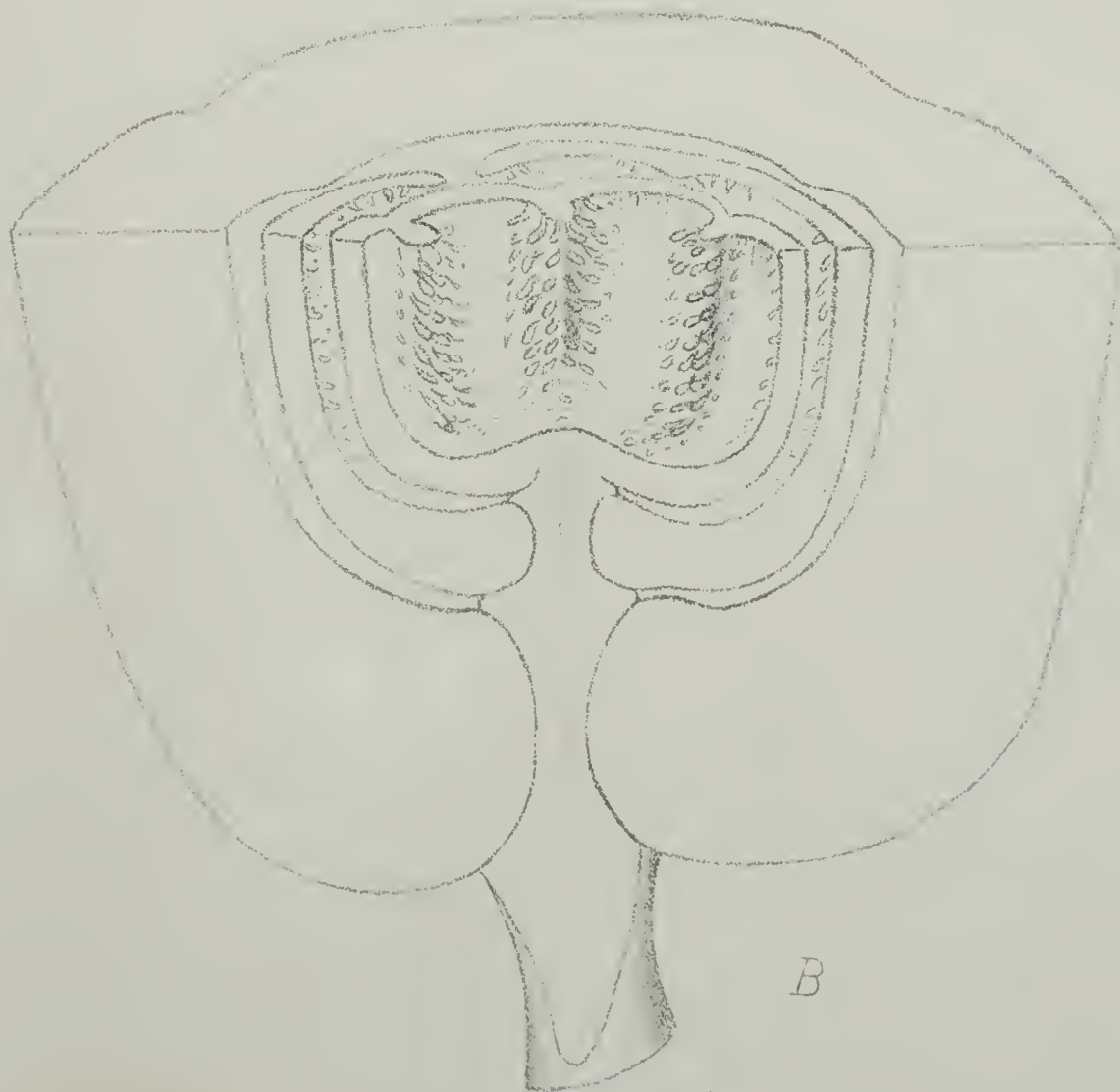
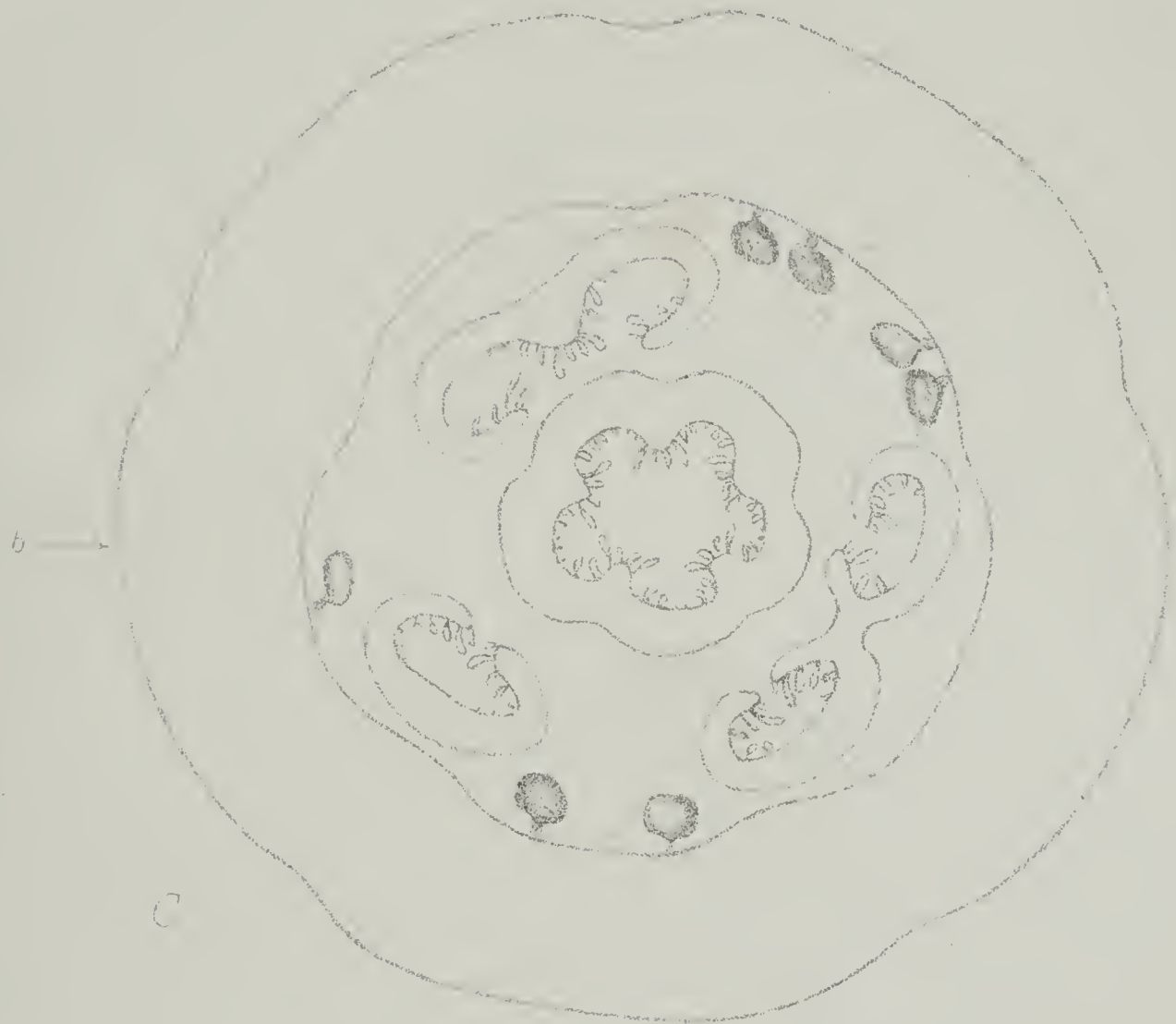
श्रीराम



श्री गौरीशंकरा च्यां नमः ॥ सिद्धि ॥ श्रीगज एव पुरा न समस्त प्रक्रिया विराजमान श्री
 मशमेश्वरी बरत प्रसाद नवा नील विमाना वना पराशरारूप नारायण महराजाधि
 राज श्रीमन् शिवसिंहदेव पादाः सज्जरविजयिनः जरित्तया पी विसपी ग्रामवास्तव्यस
 कललौकान्त्रकर्मकांशुसमादिशान्तिज्ञातमनुभवतां शोभोपमस्माजिः सप्रक्रियाभिनव
 जपदेवमहाराजपरिततठ्ठु श्रीविद्यापतिः स्यः शासनीकृत्यपद त्रीग्रामकल्याणप्रमे
 तेर्षोपवनकरीचकर्मणादिकर्म्मकरिष्यते तिलसं १६२॥ आवराशुकु ७७० ॥ श्रीकास्तु ॥
 अष्टौलच्छरासेन नृपतिमतेव ह्यिष्टुहृद्विंतेमासि आवासां सज्जके मुनितिथौ पछ्येव
 तच्छेगुरौ । वाग्व्याः सरितस्तदे गजरथेत्याख्या प्रसिद्धे पुरेदित्सौ त्साहविव द्धवा
 हपुलकस्तस्यायमथ्ये सज्जम् ॥ पला वान्प्रपुरोर्ध्वं पृथुतरा भोगं नदीमातृकं सा
 रणं ससरोवरं विसपीनामानमासीमतः श्रीविद्यापतिशर्म्म रासुकवये पुत्रादि
 निर्वृजतांश श्रीमान् शिवसिंहदेव नृपतिर्गामं देशासनम् ॥ येन सा हसमयेन
 शस्त्रिणा तुंगवाह्वरपृष्ठवर्तिना । अश्वपतिवलयोर्वलं जितं गजनाधिपतिगौड
 नृनुजम् ॥ तौ पाकुं न ईव कञ्जल रेखा श्येत पद्म इव शौ वलवल्ली । पस्पकीर्तिनवफे
 तककाश्याभ्यानिमेति विजितो हरिणांकः ॥ द्विषद्बृ पतिवाहिनी रुधिरवाहि
 नीकोद्विक्लिः प्रतापतरु वृद्ध पेसमरमेदिनी प्राविता । समस्त हरिदं न वि
 कुरपाशयास रुमं सितप्रसरपाण्डरं गति येन लघुं पशामत रुजस्थ
 प्रदः क्रनकदानकलुद्रुम सुलापुरुषमद्भुतं निजधनैः पितादापितः ॥
 सुखानिवमतात्मना जगति येन नृमीनुजा परापरपपो निधिप्रथममे
 त्रपात्रं सदा ॥ नरपतिकुलमाव्यः कर्णा शि द्यावदान्यः परिवितपर
 मार्यो दानतुष्टुार्थिसार्थः ॥ निजयरितपवित्रो देवसिंहस्पुत्रः सज्जपति
 शिवसिंहो वैरिनागेन्द्र सिंहः ॥ ग्रामे गुरुं न्त्पमुस्मिन् किमपि नृपतयो
 हि नृयो न्येतु रूपा गोकेलस्या त्ममां सैः सहितमनुदिनं नृजते ते स्वधर्म्म । पे
 यैतं ग्रामरत्नं नृपकररहितं पालयेन्निप्रतापैस्तेषां सत्कीर्तिगथादि
 शिदि शिशुविरं गीप्रतां वद्विपृद्दैः ॥ सनट ०६ संवत् ५४५५ शाके ५३१५

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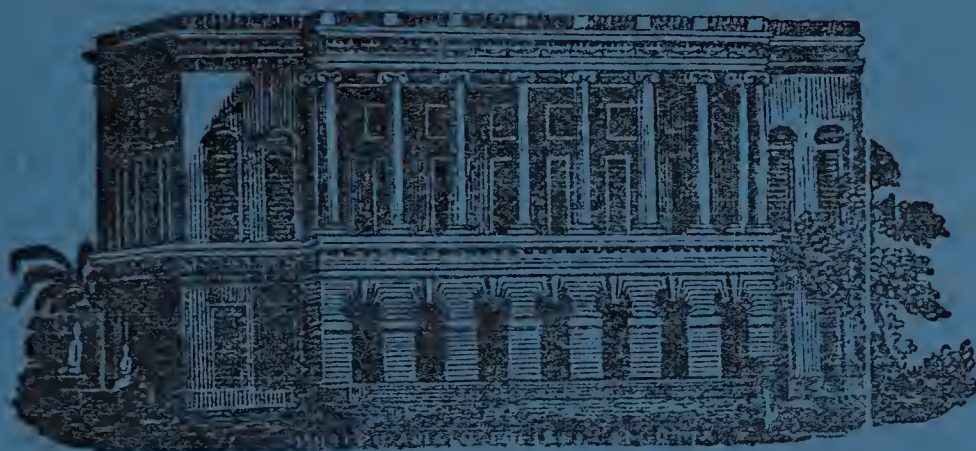




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No. I, JANUARY, 1895.



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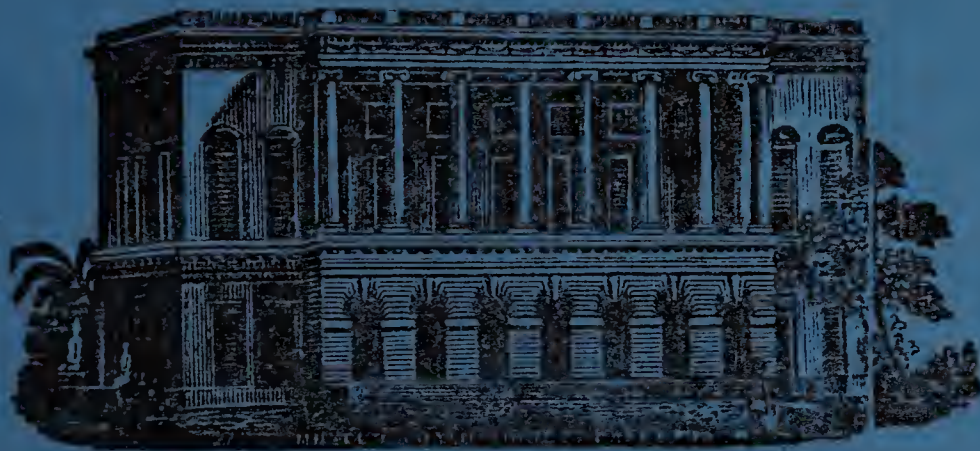
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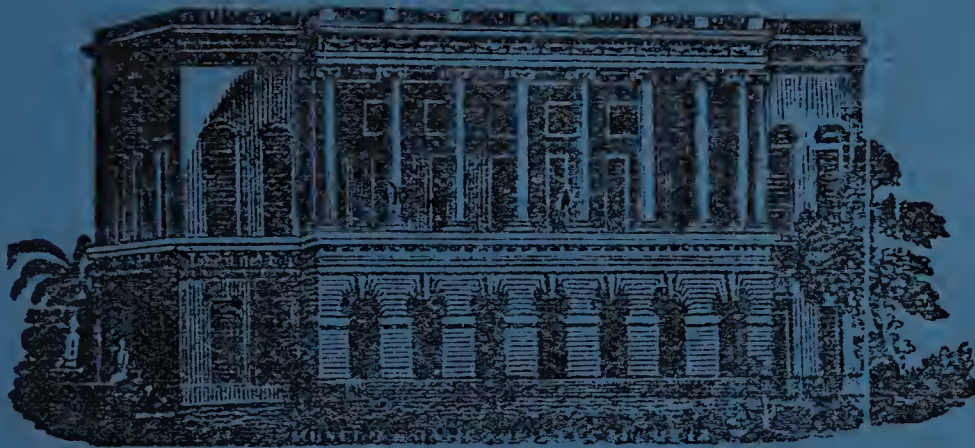
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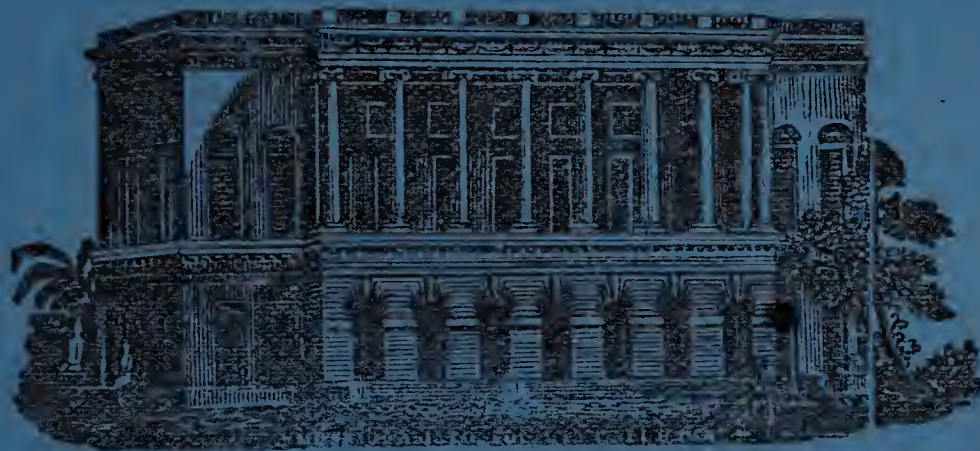
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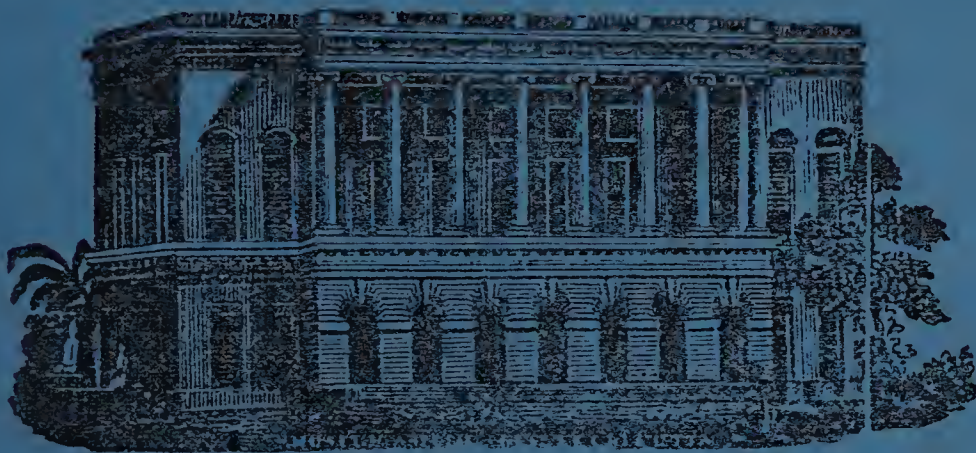
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